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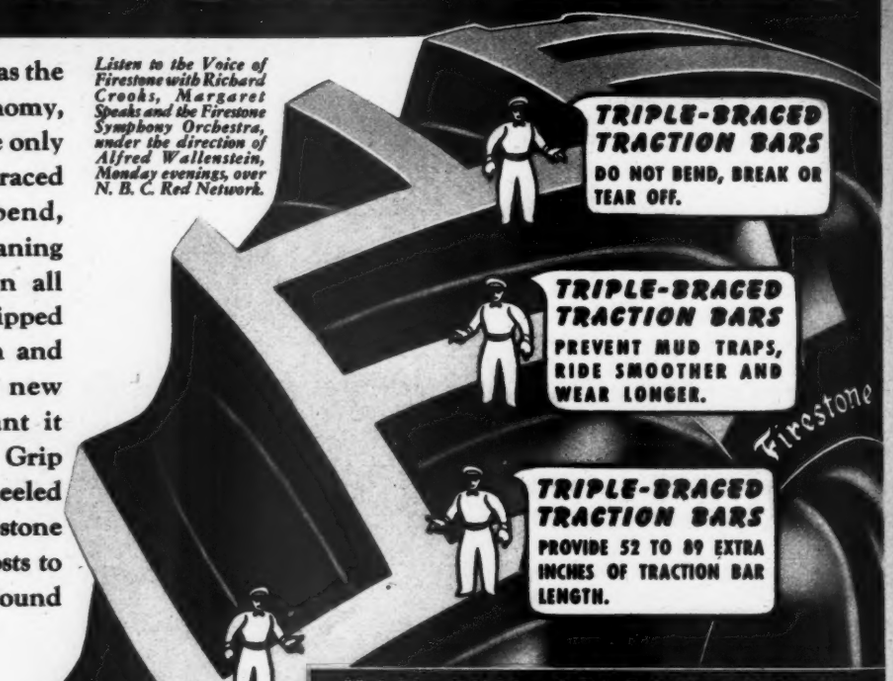
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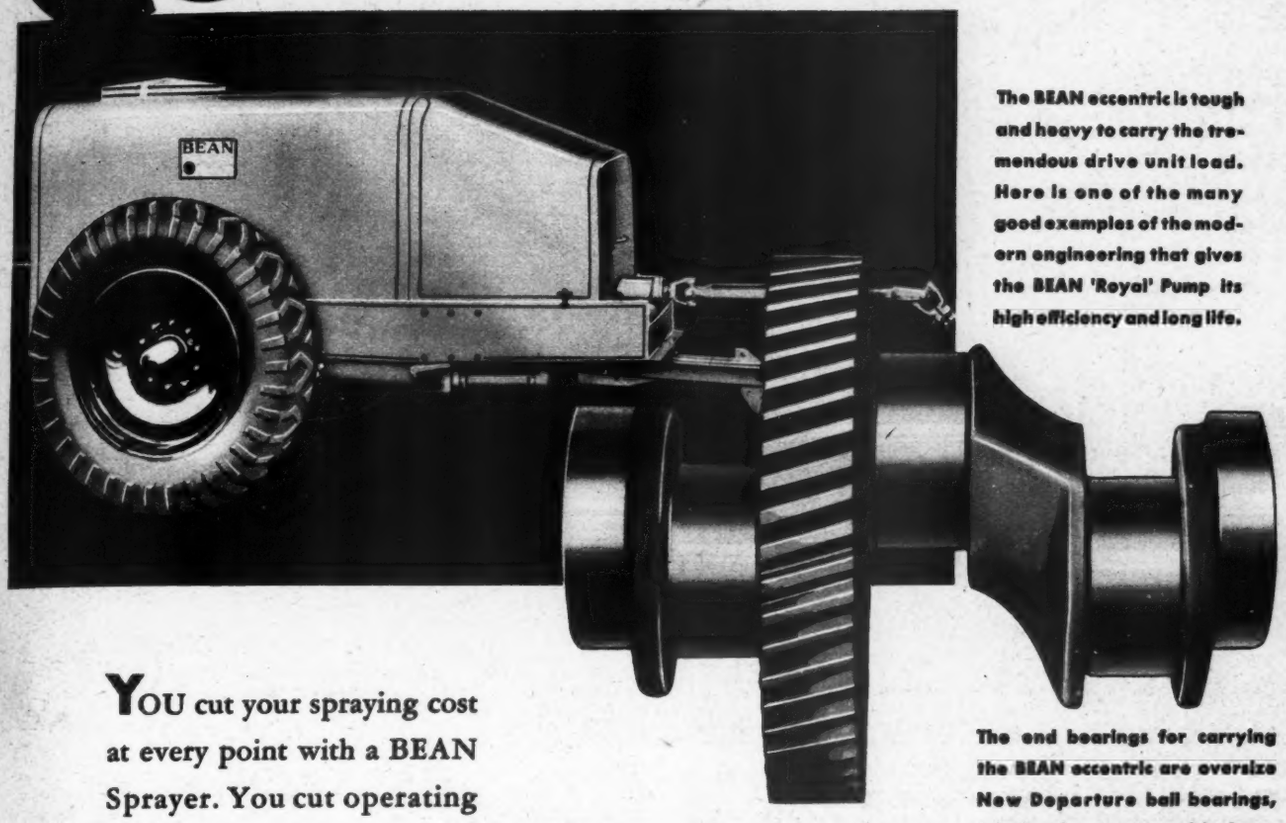

The BEAN eccentric is tough and heavy to carry the tremendous drive unit load. Here is one of the many good examples of the modern engineering that gives the BEAN 'Royal' Pump its high efficiency and long life.

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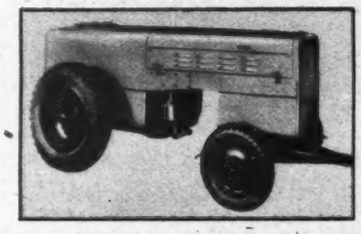

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SPRAY WITH SHELL and *SAVE!*

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BETTER CONTROL—BIGGER PROFITS

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FREE ADVICE ON YOUR PEST-CONTROL PROBLEMS

The very problem that may be stumping you now has probably been faced and licked by Shell's staff of entomologists. For free advice on pest control, inquire at your local Shell office. Or, if you live east of Rockies, write: Spray Oil Dept., Shell Oil Co., Inc., 50 West 50th St., New York, N. Y. If located on Pacific Coast, write: 100 Bush St., San Francisco, Calif.

Shell Neutrol Dormant Spray Oils . . . kill scales, leaf rollers, red mites, etc. These spray oils are also an ideal aid in the control of aphids, bud moths and case bearers.

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SHELL *TIME-TESTED* SPRAY OILS

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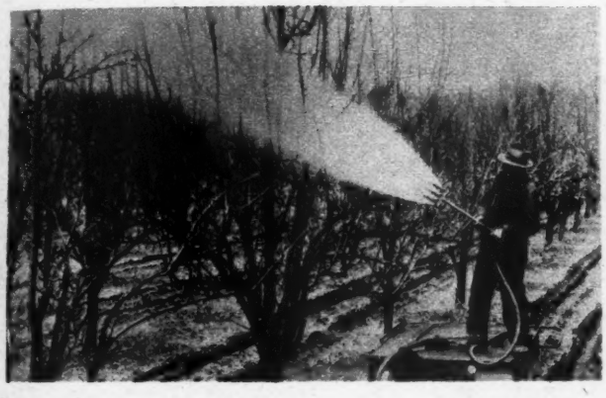
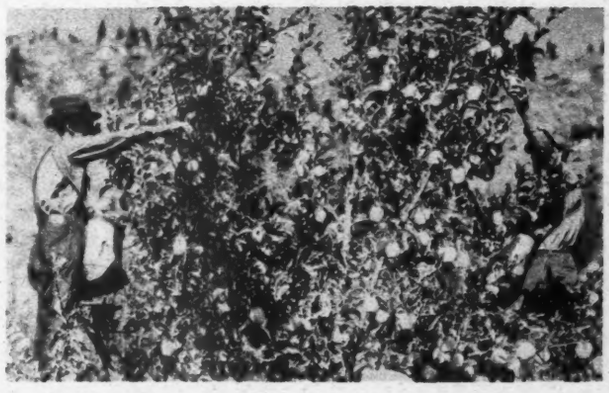
THE VITAL "FACE VALUE" Lies In The Spray Schedule You Plan Today!

FROM DORMANT *To* HARVEST





"FACE VALUE" of your apples will be your *leading* sales factor when you market your crop this year. With competition running high, Mrs. Consumer, *the ultimate buyer,* will depend more than ever before on "first impressions" when she selects the fruit she will take home to the family. And although she may never have heard of a spray schedule, that, in the last analysis, is what makes her buy when she picks out the "best looking" apples at the corner store.

FOR BIGGER APPLE SALES, BEGIN NOW AND CARRY THROUGH WITH THESE ORCHARD* BRAND PRODUCTS!

FOR DORMANT SPRAYS . . . Oil sprays, *two of them!* Choose from below the type you prefer. *Both ranked at the top* for oil depositing properties in 1940 tests covering 15 oil sprays conducted by a foremost experiment station.

DORMASOL*, emulsible, 97½% mineral oil.

OIL EMULSION "83"*, an "old reliable" brought up to date, flows from the bung!

NOTE: Recommended dosages for these oils are lower because of demonstrated ability to deposit *more* oil. For controlling scale insects, leaf roller, bud moth and red mite.

ORCHARD BRAND LIME SULFUR SOLUTION A 35 year background of leadership. Clear, potent, pure!

FOR DELAYED DORMANT OR PRE-BLOSSOM SPRAYS (To control aphis)

ORCHARD BRAND NICOTINE SULFATE, enjoys widespread preference among commercial fruit growers.

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MICRO-SPRAY* SULFUR, has true microscopic particle size. . . . Sets high performance records in filming and fungicidal effectiveness.

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First Brood . . . ORCHARD BRAND ARSENATE OF LEAD, "ASTRINGENT" OR STANDARD, improved flake-like particles—the original—give you more uniform spray coverage and more dependable control.

Second Brood . . . GENICIDE* the high speed killer that solves the residue problem—sets a new "high" in worm control. Write for complete details.

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*Reg. U. S. Pat. Off.

How can you know *in Advance* what kind of tires will work best on your tractor?

EVEN if you've never used rubber tractor tires before, you won't make any mistake when you do buy them—if you just remember a few things you've always known.

You know, for instance, that a tire whose tread fills up with dirt will slip in soft ground. That of course cuts down the work your tractor can do.

You also know that tires that slip on wet sod cut down the number of hours you can use your tractor each day.

So you know you need a tire whose tread is free from closed corners or pockets that pack up with dirt like a horse's hoof. You need a *self-cleaning* tread that's able to dig in and pull, in all kinds of soil, a tread that can take a good "bite" even on wet sod—and pull ahead.

That's the kind of tire that will get the most work out of your tractor.

And that kind of tire is—the Goodyear Sure-Grip, pictured here.

Notice that each of those deep, sharp-edged lugs stands alone—no mud-pockets to fill up. This tread design is *self-cleaning*.

Notice, also, that each lug is the same size—and even-spaced. That means each lug grips the same—without jerks that start spinning.

And, even in the picture, you can see that each lug bar is *wider* at the base than at the top—built like a dam—to stand years of hard pulling with no danger of tearing off.

Whether you're buying a new or used tractor—or putting rubber tires on your present tractor—it will pay you to insist on these stand-out features of the Goodyear Sure-Grip.

. . .

P. S. For your car or truck there is a complete range of Goodyear tires—and they cost far less than you imagine.

Oscar, the scarecrow, says, "You can't beat a self-cleaning tractor tire for grip and pull."

THE SELF-CLEANING TRACTOR TIRE

Open center—no mud traps. Look at the lugs on that tire. Each one is separate. No pockets where earth can pack.

Even spacing—no jerks. See how those lugs are placed—with plenty of space between them—and all spaced the same. That means an even pull—no jerks to start slipping.

Buttressed base—no lug tear. Those lugs are broader at the bottom than at the top—each one is self-reenforced. No need to join them together to hold them on. They're strong enough to stand alone.

THE GREATEST NAME IN RUBBER

GOODYEAR

SURE-GRIP—the Self-Cleaning Tractor Tire

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FEBRUARY, 1941
VOL. 61 No. 2

AMERICAN FRUIT GROWER

The NATIONAL FRUIT MAGAZINE

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MALNUTRITION IN GERMANY . . .

ERSATZ is the magic word for many of Germany's shortages. Science and chemistry have combined to produce substitutes for apparently everything but proper food. No quantity of pills, tablets and capsules can take the place of the vitamins and minerals in a properly regulated and balanced diet. Accordingly, there is now widespread evidence of malnutrition in Germany.

This is the opinion of war correspondents who have returned from Germany and who lived there under German food restrictions. Otto Tolischus, New York *Times* Berlin correspondent and 1939 Pulitzer prize winner, who has just returned from Germany, said in Cleveland that the Germans need fats, fruits and vegetables to maintain national efficiency and to restore vitamins and minerals lost in two years of unbalanced diet.

The importance of the fruit industry in national defense is clearly established. For the want of fruit Germany may lose the war. The orchards of America are needed to keep our military man power efficient and active and to develop the health and strength of the great body of American youth being trained for military service.

HAVE YOU ADVANCED BEYOND THE PRACTICE OF SPRAYING WITH THE WIND? . . .

DR. PAUL J. CHAPMAN, whose speech before the Michigan State Horticultural Society is printed on page 9, asked this question of a group of growers at the Michigan meeting. The inference carried in this query is that spraying with the wind is unsatisfactory because two applications made with the wind overlap and the part of the tree which receives double the amount of spray material is liable to injury. At the beginning of another spray season it is important to study improved methods of application as well as the use of new and more effective materials. The best spray material may damage the tree or give poor control if applied improperly.

APPLESAUCE AND PORK CHOPS . . .

IT IS HARD to see how a powerful $2,000,000 advertising campaign to sell meat, such as is currently being sponsored by the Meat Institute, can benefit fruit growers, but such has been proven to be the case. Many growers have noted an increase in the demand for apples when pork is featured in meat advertising. Evidently pork chops and applesauce have not lost their dietetic appeal.

THE CHOICE OF EXPERIENCED GROWERS

The NEW McCormick-Deering O-6 Tractor

McCORMICK-DEERING TRACTORS AND MACHINES

The experienced fruit grower doesn't take chances when his crops are at stake. He can't afford the "trial and error" method of selecting equipment when his profits hang in the balance. That's why so many thousands of growers choose the equipment they know they can count on—McCormick-Deering Tractors and Machines.

Down through the rows of trees—where performance counts most—this tractor and implement teamwork has built its outstanding reputation for dependability. Now the NEW streamlined McCormick-Deering Orchard and Grove Tractors step into the scene, bringing increased efficiency, greater performance and economy, new comfort and operating convenience.

The compact McCormick-Deering O-4 and the larger O-6 have powerful 4-cylinder, gasoline-distillate, valve-in-head engines (high compression engines for operation on 70-octane—or higher—gasoline, optional); replaceable cylinder sleeves; and many other quality International Harvester features. The McCormick-Deering implement line includes plows; cultivators; disk, spring-tooth, and peg-tooth harrows in sizes and types to meet every requirement.

See the nearby International Harvester dealer for complete information. He will gladly arrange a demonstration to suit your convenience.

INTERNATIONAL HARVESTER COMPANY
180 North Michigan Avenue **Chicago, Illinois**

McCORMICK-DEERING

DO YOU OBSERVE THESE SPRAYING RULES ?

1 See that the spray machine is ready to operate during the first good spraying period in the spring. At best there are not many good days available to apply the dormant spray. Do the repairing and conditioning of your spray machine *before*, not during this spraying period.

2 If possible follow the practice of spraying the entire tree in one operation.

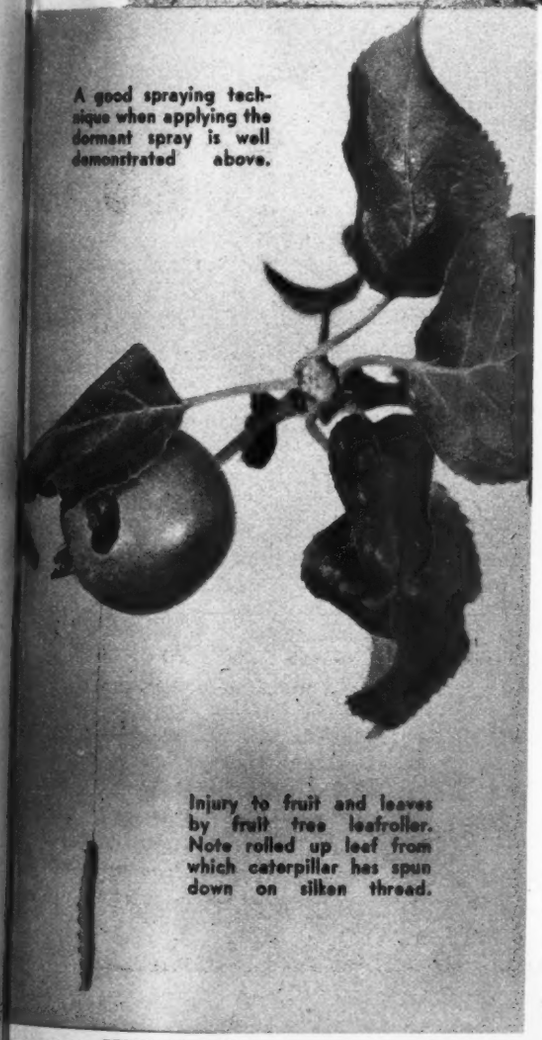
3 Avoid spraying on excessively windy days, or when trees are wet or when the temperature is near or below freezing.

4 If possible spray from the ground, especially when combating the rosy aphid. Best practice is to use two spray operators, one on the ground and the other on a tower.

5 If you are tank-emulsifying oil sprays, take pains to do the job properly, thus avoiding tree injury and poor results.

6 It is poor economy to stint on the amount of spray material applied as your loss may be two-fold: Loss of the money paid for spray material and for applying the spray, plus loss in damaged fruit as a result of poor control.

A good spraying technique when applying the dormant spray is well demonstrated above.



Injury to fruit and leaves by fruit tree leafroller. Note rolled up leaf from which caterpillar has spun down on silken thread.

NEW FACTS ABOUT OIL SPRAYS

By P. J. CHAPMAN
New York State Agricultural Experiment Station

THE history of the use of petroleum oils in dormant and semidormant sprays for deciduous fruit trees in this country is essentially the history of the evolution of the dormant and semidormant sprays themselves. San Jose scale can be blamed for the initial developments in this field. With this pest threatening to destroy the entire industry—or so it seemed at the time—it became imperative that some effective treatment be developed to avert this disaster. Kerosene emulsion, crude petroleum oils and strong lime-sulphur solution were the earlier materials advocated. These particular petroleum products soon acquired a bad name because of the injury they caused to the tree. It was not until about 25 years ago that the petroleum oils received anything like general recognition as being effective and relatively safe dormant treatments for deciduous fruit trees. What brought about this change was the introduction of the lighter grades of lubricating oil for this purpose. These oils proved very efficient in controlling such pests as the San Jose scale, fruit tree leafroller and pear psylla. But they were deficient in one important particular; they were ineffective against the rosy aphid.

A line of investigation was then started and continues to the present, which had as its objective the finding of some substance which can be added to oil to render it effective against the rosy aphid and other pests for which oil alone is not specific. In short we have been looking for a cure-all dormant spray. To date some combination of a petroleum oil and other toxic agents has given the greatest promise of ultimate success in this undertaking.

Nicotine and oil was the earliest combination oil-toxicant dormant or semidormant spray mixture advocated in New York. And, concurrently with this formula, was the development of the oil-cresylic acid

(Continued on page 30)

NATIONWIDE SU V
EXPERIENCES WIT H

By RICHARD T. MEISTER

AMERICAN FRUIT GROWER'S Harvest Spray questionnaire is based on field tests performed by large commercial growers owning an average of 144 acres in apples and living in 25 fruit growing states. Eighty-five per cent of the growers left check blocks, indicating they compared results with unsprayed trees. To the growers who filled in the questionnaire, AMERICAN FRUIT GROWER extends its appreciation for their co-operation. —EDITORS.

THROUGHOUT the apple growing sections of the country, from the irrigated apple ranches of Washington's Wenatchee Valley east to the huge hillside orchards of the Appalachian belt and north to the thrifty fruit farms of New England, pioneer American growers were busy last harvest season applying a new spray to their trees.

As seasonal fall winds licked hungrily at apple orchards, anxious to seize whole crops and spill them on the ground, many of the nation's growers unlimbered spray rigs in an effort to keep Nature from making windfalls out of potential U.S. Fancy or U. S. No. 1 apples.

They were using materials about which relatively little was known. Growth-promoting substances or hormones known as napthalene acetic acid and napthalene acetamide had been shown by U. S. D. A. research experts to be helpful in preventing dropping of apples. The big question facing growers was whether or not the spray would hold its magic under commercial conditions.

AMERICAN FRUIT GROWER's first Harvest Spray Questionnaire reveals what the growers discovered, what the consensus of opinion is among them.

Over 175 growers, owning an average of 144 acres in apples and representing 25 fruit growing states, filled in questionnaires and told, among other facts, exactly how they used the spray, what varieties they sprayed and what results they obtained.

"Are you planning to adopt the Harvest spray as an annual orchard practice?" was the key query. A majority of 72 per cent answered yes, indicating they considered the spray important enough to become a regular orchard operation. Five per cent decided against it and 23 per cent did not make a decision.

One grower who answered yes to this question was enthusiastic about his results and said, "The 800 bushels we picked from this block had some of the best color and size of any we grew, packing about 90 per cent No. 1. One buyer told us, as he watched us pack, that they were the best lot of McIntosh he had seen."

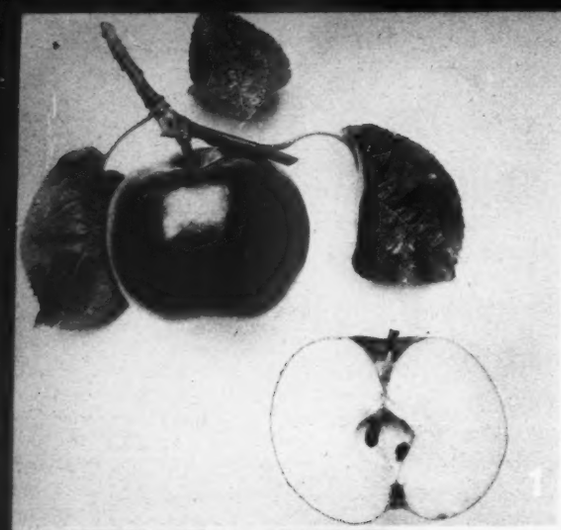
Typical remark of those still skeptical was, "Until storage season is over we question whether saving in harvesting operations may not be offset by stem pulling or overripe condition of fruit causing internal breakdown in storage."

Eighty-five per cent of the growers questioned were experimentally minded enough to leave trees unsprayed for comparison with sprayed trees. Fifteen per cent reported they made no comparisons.

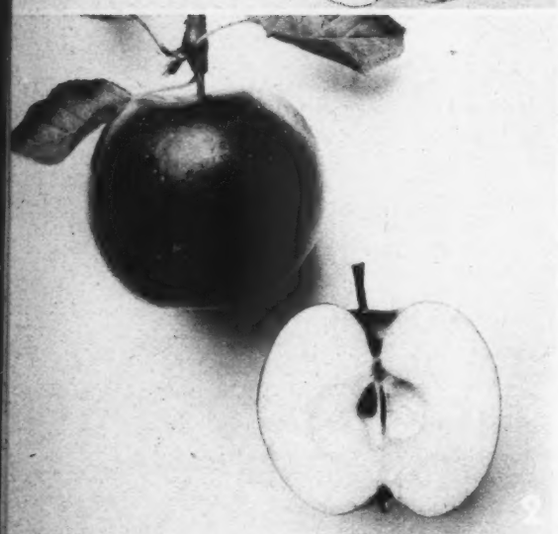
McIntosh

Growers who applied the spray to McIntosh obtained fairly good results. Fifty-seven per cent termed the spray's action in preventing drop good, 26 per cent said it was fair and 17 per cent said it was poor.

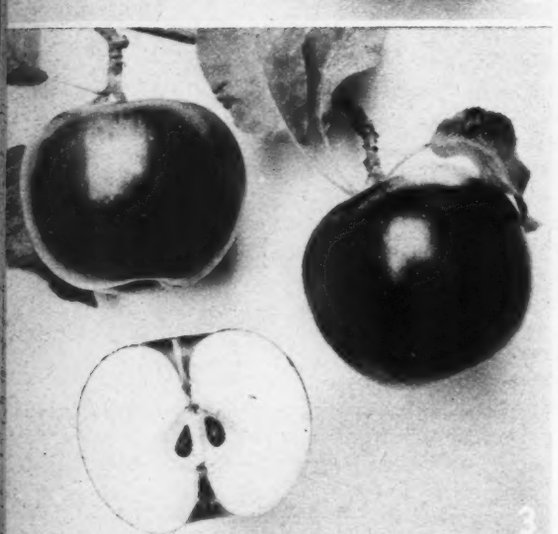
Two-thirds of those who sprayed McIntosh applied one spray only, about one-third put on two sprays and one grower went so far as to apply three sprays. Of those who applied two sprays, no one reported



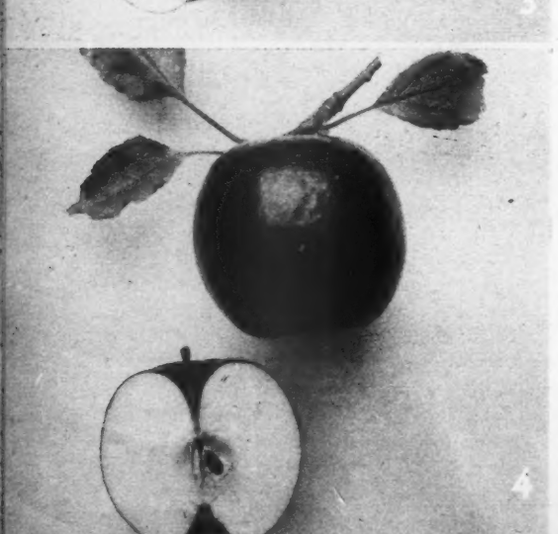
1 More growers who used the spray applied it to McIntosh than to any other variety. McIntosh stem is short and slender, not so easy to hit as long stems on varieties like Rome and Jonathan.



2 Rome stem is long, relatively easy to hit with growth-stimulating Harvest spray. Results with Rome ranked only behind Williams, 87 per cent of the growers applying the spray obtaining good results.



3 Extra precaution must be used when spraying Wealthy because the stem is short, slender and relatively difficult to cover with spray. However, small fruits may have rather long stems, easier to cover.



4 Jonathan stem is long and slender, more easy to hit than short stems on varieties like Grimes and Wealthy. Results with Jonathan were not exceptional, only 44 per cent reporting good results.

VEY OF GROWER HARVEST SPRAYS

poor results, while about one-fourth of those who applied one spray obtained poor results.

Those who obtained good to fair results applied sprays four to five days before their McIntosh usually ripen while those who got poor results sprayed two to three days before ripening.

The apples were picked about six days later than unsprayed trees which gave most growers (80 per cent) an increase in color and about half an increase in size. Growers who obtained good to fair results estimated the spray saved an average of two bushels per tree which more than paid for the extra cost. A few of the growers (20 per cent) said apples were difficult to pick.

Delicious

Delicious growers were more successful in preventing drop than McIntosh growers. Seventy per cent of those who used the spray on Delicious said they obtained good results, 21 per cent reported fair results and nine per cent got poor results.

The majority applied one spray to Delicious. Only 13 per cent applied two sprays and they reported no better results than those who applied only one spray. Trees were picked on the average of five days later than usual and most growers (86 per cent) reported an increase in color and slightly more than half (62 per cent) reported an increase in size. One grower said, "Ninety per cent of my Delicious increased from U. S. 1 to Fancy color, and 15 per cent increased in size."

Growers who reported good to fair results estimated they saved one to two bushels per tree from dropping by applying the spray. Forty-four per cent said they had difficulty in picking. One Delicious grower wrote, "Due to late arrival of material our spraying helped but was not entirely successful," which should flash a warning sign to those growers who intend to delay buying their Harvest spray materials next season.

Stayman Winesap

Growers of Stayman Winesap apples who applied the Harvest spray got about as good results as Delicious growers. Seventy-two per cent reported good results, 18 per cent obtained fair results and 10 per cent termed results poor.

Nearly all the growers applied but one spray. Trees were picked on the average of six days later than usual and most growers (79 per cent) reported an increase in color and little less than half (43 per cent) reported an increase in size.

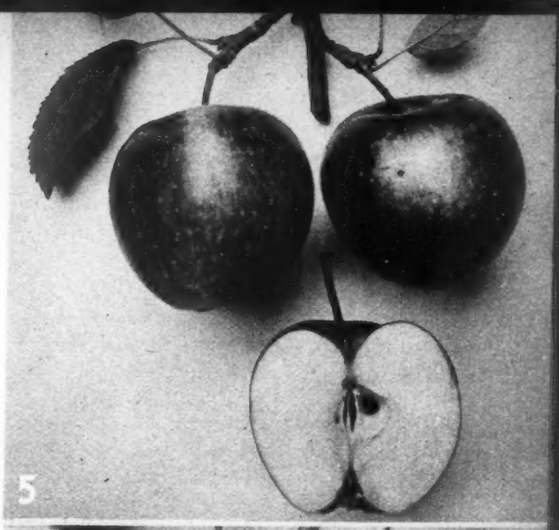
Growers who obtained fair to good results estimated they saved two to three bushels per tree by spraying. Fifty-four per cent said apples were difficult to pick.

One grower who got good results with his spray on Stayman said: "Never once have I been able to pick a normal quantity of Staymans. We would watch them very closely for color (in our territory they appear to change from slate to red in 24 to 48 hours) and just about the time we thought the next two or three days would put the finishing touches on them they would let loose. We sprayed Stayman this year and they had better color and fewer apples dropped."

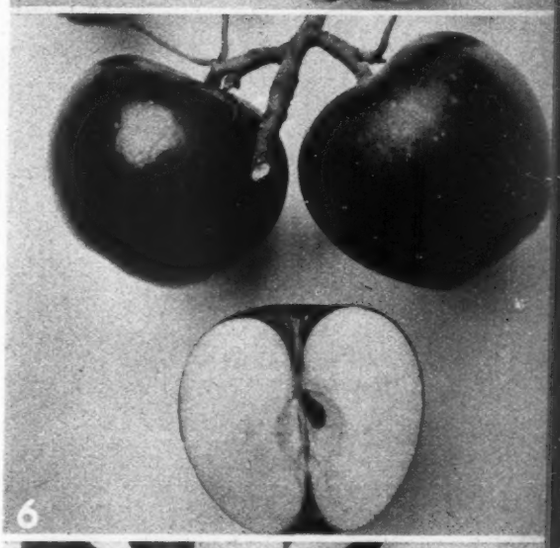
Wealthy

Results with Wealthy were not as satisfactory as with Stayman and Delicious. Only 46 per cent obtained good results, 27 per cent reported fair results and 27 per cent said results were poor. Growers who got good results applied their spray four days before the variety usually ripens, those that reported fair results three days before, and those that got poor results two days before usual ripening.

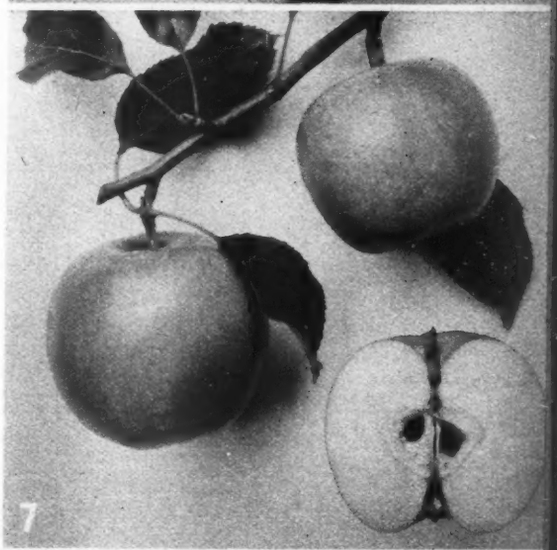
(Continued on page 26)



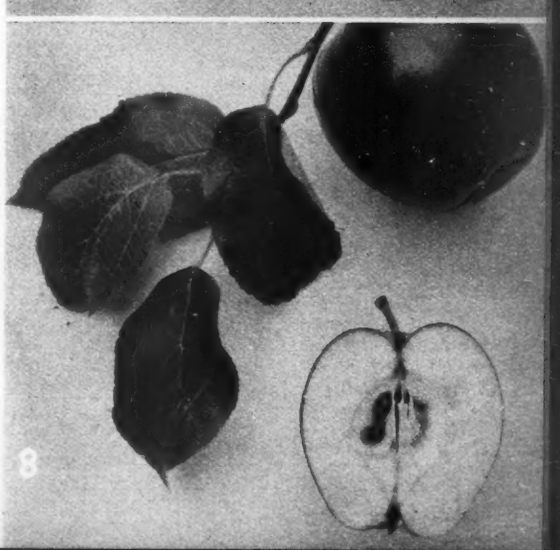
5 Growers obtained promising results with Delicious, 70 per cent terming their results good. This may in part be due to the Delicious stem, which is long, medium thick, and relatively easy to hit.



6 Stem of the Stayman is short, similar to stems of McIntosh and Wealthy. More thoroughness in spraying is required to get good coverage. Seventy-two per cent declared they obtained good results.



7 Grimes has a short stem, difficult to cover with Harvest spray. One-third of the growers using the spray reported good results, one-third obtained fair results and one-third obtained poor results.



8 Growers unanimously reported good results with Williams. Williams stem is medium to long and thick, thus relatively easy to hit with Harvest spray materials which prevent the dropping of apples.

WHAT THE STATE EXPERTS SAY ABOUT HARVEST SPRAYS

A SYMPOSIUM OF OFFICIAL OBSERVATIONS MADE IN LEADING FRUIT AREAS

Workers in experiment stations carried out scientific investigations on Harvest sprays last fall to learn how they behave under different conditions and the effect they have on tree and fruit. With customary thoroughness they analyzed the results of their experiments in order to ferret out facts of benefit to growers. AMERICAN FRUIT GROWER presents the observations of these workers, for the thoughtful consideration of its readers.

OREGON

FROM the standpoint of delaying drop of certain varieties of apples, the minute quantity of naphthalene acetic acid used in 100 gallons of water as a spray is—for lack of a better word—nothing short of miraculous. When we consider that four grams of these crystals, which is not more than a thimbleful, in 100 gallons of water, will so profoundly affect an apple tree that fruit will not drop for a period of two to three weeks, one becomes almost speechless. The significance of this reaction cannot be adequately expressed in percentages and statements. One must actually see the demonstration in the orchard to fully appreciate the magnitude of the change in tree performance that takes place. From appearance, it would seem that two of the apple growers' problems—color increase and drop prevention—had been completely solved. But have they been solved? Examination of the fruit indicated that water core involved most of the fruit—many apples seriously affected. A number of unknowns come to mind. Up to the present time, physiological effects on the trees, particularly as related to early winter freezing, and various types of injury that can follow the occurrence of low temperatures, have been given little study. Many years of practical experience and observation have demonstrated that heavy bearing trees holding their fruit late into the fall, are much more subject to winter freezing and killing than trees of the same variety in the same orchard bearing little or no fruit. Usage should be confined to varieties that have given trouble from the standpoint of color and drop.—LEROY CHILDS, Hood River Branch Experiment Station.

MASSACHUSETTS

WITH the Duchess variety the pre-harvest spray proved very effective. There was very little drop from the sprayed trees even beyond the proper picking stage. The check trees dropped heavily. With Wealthy, the hormone sprays had some effect but actual control of dropping was rather mediocre in most cases. Better results were secured with stronger concentrations. Most of our tests were on McIntosh and showed considerable variability of effectiveness depending on the timing of the application, the amount of hormone in the spray solution, the particular trees or block of trees used for the experiment and other factors. In most cases, there was a beneficial effect from spraying. Expressed as per cent of total crop, the drop from checks exceeded that from sprayed trees by as much as three or four to one. The effect of hormone applications was usually evident by the third or fourth day and persisted with McIntosh for about eight to 12 days. It is possible higher concentrations may be necessary for desired drop control with McIntosh and some other sorts. We feel that the most profitable use of harvest sprays in McIntosh orchards is likely to be: 1. In orchards that have a record of dropping badly in previous years or of producing poorly colored fruit. 2. In orchards that are of vigorous growth from natural fertility or liberal fertilizer applications. 3. In seasons when warm, moist weather prevails in August and early September. 4. In orchards where the crop is good to heavy.—LAWRENCE SOUTHWICK and J. K. SHAW, Massachusetts State College.

RHODE ISLAND

VARYING concentrations of naphthalene acetic acid had a pronounced effect in delaying the abscission of McIntosh apples. When a concentration of 0.001 per cent was used, the effect of the spray persisted for about 10 days. Two sprays at a concentration of 0.0005 per cent with an interval between sprays of six days was effective in delaying fruit abscission for 14 days. However, when this interval was lengthened to eight days, the amount of fruit drop increased significantly. The apparent value of naphthalene acetic acid and several commercial compounds as pre-harvest sprays on Baldwins and Rhode Island Greenings is questionable on the basis of this past season's studies. The Greenings held their fruit satisfactorily until October 1, while the sprays were not effective on Baldwins. The Baldwins were sprayed late in the season and the temperatures were much lower than when the McIntosh were sprayed. This may partially account for the ineffectiveness of the materials.—LYLE M. MURPHY, Rhode Island Experiment Station.

NEW YORK

QUITE a little cool weather prevailed in late August and September in New York State and in general McIntosh colored up better and there occurred about the smallest drop of any year for the past several seasons. Naphthalene acetamide and naphthalene acetic acid sprays appeared to be equally effective on McIntosh apples. In one set of tests on 25 tree blocks, the spray reduced the drop from 20.2 per cent to three per cent. The spray was effective for 10 days on McIntosh, wearing off rapidly after that time. In another part of New York on six tree blocks, the drop was reduced with two successive sprays from 48 per cent to 3.6 per cent. About 75 per cent of our growers used the pre-harvest spray this year, mostly on McIntosh. Comments have been quite favorable.—M. B. HOFFMAN, Cornell University.

VIRGINIA

FOLLOWING the application of the hormone on Mother variety, some trees of which were severely damaged by fire blight, there was more variation in the drop due to difference of tree vigor than from any other factor. Trees of low vigor continued to drop their fruit in spite of the hormone application. On Delicious trees whose foliage was in poor condition due to the absorption of copper from Bordeaux mixture, a mixture concentration of four grams of naphthalene acetic per 100 gallons of water failed to stop the drop. Almost no fruit dropped from Delicious trees which had not received the Bordeaux mixture. Variation in tree vigor was an important factor in the results obtained by fruit growers on a number of varieties, including York, Stayman Winesap and Winesap.—W. S. HOUGH, Winchester Research Laboratory.

MISSOURI

TO summarize all the evidence obtained from experimental work and from practical experience of commercial apple growers, it may be said with considerable certainty that the pre-harvest sprays are desirable and profitable for varieties that are notoriously bad droppers or at times when heavy drops may be expected from any variety because of abnormal weather or for other causes. The applications must be carefully timed. The spray becomes effective in two to three days and the influence continues for 10 to 14 days, after which dropping may begin again. Spraying must be thorough, requiring more gallons per tree than is usually given for cover sprays. The stems of all apples must be wetted completely, especially the part where the stem is attached to the spur. Long-stemmed varieties seem to respond more favorably to the hormone treatment than short-stemmed ones. No definite information is available at present on the relation of hormone sprays (delayed picking) to storage quality of particular varieties.—A. E. MURNEEK, University of Missouri.

MICHIGAN

FOUR commercial preparations of hormone carriers were applied as pre-harvest sprays in McIntosh and Steele Red apple orchards by the Michigan Experiment Station, three of the four materials being tried with and without spreaders. Average percentages of drop on unsprayed trees were only 6.5 per cent in the case of McIntosh and 4.7 per cent in the case of Steele Red. Where check trees drop such small numbers of apples prior to delayed harvest, there can be no significant differences between treated and non-treated plots. However, 1940 was an unusual season in respect to dropping of apples in most Michigan orchards. Two McIntosh trees in our college orchard, to which hormone sprays were not applied, were not harvested until about three weeks later than the commercial picking time for the season. These trees dropped less than 25 per cent. August and September, with the exception of a few days, were cool and rainfall was considerably above the average. Possibly both these factors operated to make the apples stick better than in most other years. Many growers tried the materials and most of them reported very satisfactory results, in fact, good enough that they expect to use the materials for certain varieties in 1941.—ROY E. MARSHALL, Michigan State College.

OHIO

THERE was no significant difference in the effectiveness of the several brands used.

(Continued on page 28)

"HOODED" BOOM FOR GRAPE SPRAYING

By JONAS HOWARD

EFFECTIVE spraying of row crops, even vineyards, has been the incentive for many specialized "spray booms"—the latest being especially suited to the current requirements of grape growers in the East. Progressive growers, forced to cut production costs, have used several types of booms, all designed to reduce the time and man power needed for spraying, but not always providing effective spray coverage.

Insects and diseases, a notorious handicap to lower production costs, have been controlled particularly well by some growers, using a "hooded" boom. That is a point of interest to all growers, a point substantiated by the recent investigations of research workers. They have adopted the hooded boom wherever practicable, for they find it provides uniform spray protection—the foundation of effective insect and disease control.

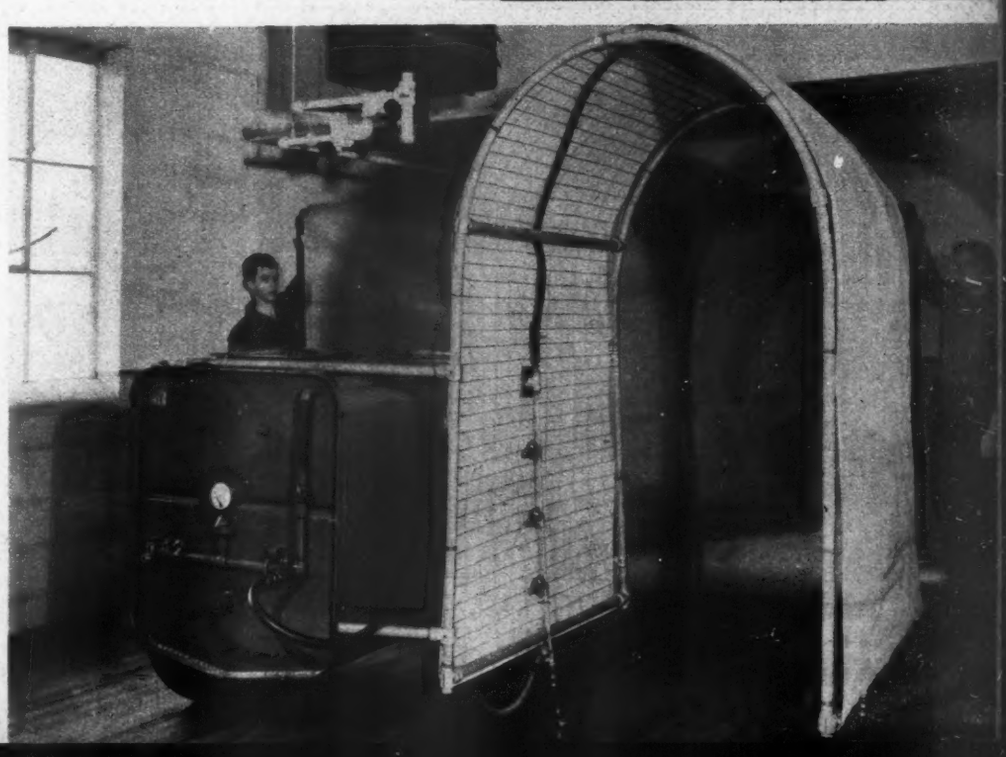
Consider the seasonal growth of healthy vines—first upward, but soon down toward the ground to form a dense protective foliage layer that prevents a horizontal spray from striking the clusters; like shingles, the leaves form a roof. Early black rot sprays may be easy to apply, but to keep the clusters free of late infection and berry moth damage, and to protect the undersides of the leaves from leafhoppers, the hooded boom seems necessary. Nozzles low, directed upward, penetrate beneath the foliage "roof" and drive the spray up through the vines, striking the clusters and the undersides of the leaves. From both sides, the spray envelops the vine effectively. But the drift from sprays directed upward blows away from the row, to the discomfort of the operator, and may defeat the purpose of the spray by leaving some uncovered vines — "pockets" of reinfestation. Hence the "hood" is used to confine the drift and break the wind, resulting in a better spray job without discomfort to the operator.

The complete story is best told by men who market clean crops, sprayed at low cost with hooded booms. At a set speed, the sprayer travels the vineyard, drawing all vines through the hood. Coverage is assured by proper adjustment of nozzles, pressure and rate of travel. Effective application translates the experiment station data, the county agent's recommendation, even the specifications of the sprayer, into increased yield and quality, with less labor, often with less gallons of spray per acre.

The "hood" confines the drift of spray and breaks the wind, resulting in a better spray job without discomfort to the spray rig operator.

Yield, quality and value of the grape crop are reduced when spray coverage is insufficient to give full protection against insect infestation.

A detailed view of the hooded boom. Note connection with spray tank and nozzles placed low and directed upward to drive spray up through vines.



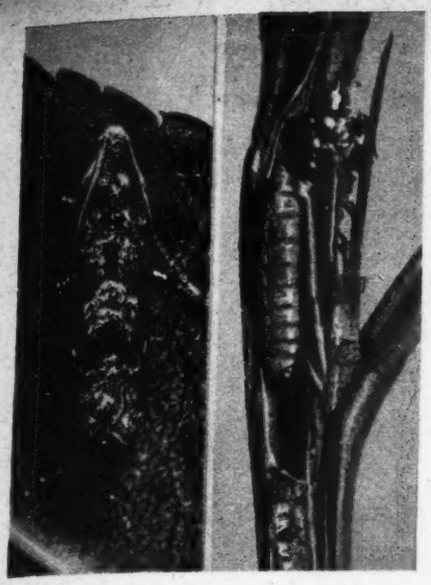
CAMERA AT MARYLAND SOCIETY MEETING

J. G. Harrison (left), Berlin, Md., president of Maryland State Horticultural Society, congratulates Porter R. Taylor of the U.S.D.A. on his speech before Maryland growers while A. F. Vierheller, secretary-treasurer of the society, listens.

Above, left to right—J. Kieffer Funk, Dry Spring Farms, Hagerstown, Md.; S. B. Waddell, New Windsor, Md.; and G. W. Gardenhour, Smithsburg, Md. Below, left to right—Lloyd Balderston, Colora, Md.; W. C. Main, Hagerstown, Md.; and D. T. Walker, Mount Airy, Md.

AMERICAN FRUIT GROWER PHOTOGRAPHS

Group, left to right—J. P. Casper, Hancock, Md.; R. O. Alwood, Chambersburg, Pa.; Robert and R. J. Gillan, St. Thomas, Pa.; and C. O. Dunbar, Arendtsville, Pa. Far right—J. Andrew Cohill (left), Hancock, Md., and R. T. Powell, Cumberland, Md. Below—A. L. Towson (left), Smithsburg, Md., oldest member of society, and J. Y. McDonald, Charles Town, W. Va. Below, center—Dr. C. H. Mahoney (left), head, Department of Horticulture, University of Maryland, and Dr. R. B. Corbett, director, Maryland Experiment Station. Below, right—Stanley Fulton (left) and R. S. Dillon, Jr., both of Hancock.



CONTROL OF THE ORIENTAL FRUIT MOTH BY MECHANICAL MEANS

By G. EDW. MARSHALL

Purdue University Agricultural Experiment Station

Upper left—Adult Oriental fruit moth on leaf and larva of moth within peach twig. Above—Injury to fruit by Oriental fruit moth.

THE Oriental fruit moth is the heaviest tax collector of the peach industry. Introduced into the United States in 1916 it spread rapidly to all peach sections east of the Rocky Mountains. Since that time attempts at commercial control of the pest have been made in many states by the application of several different methods and with varying degrees of success. In but relatively few cases has any single practice, or any combination of the several practices, been a complete success. The various means of control which have at one time or another shown promise include:

1. Early spring cultivation around the fruit trees, timed to destroy overwintering Oriental fruit moths that have transformed from the larvae into the pupal stage. Other supplementary measures, such as the application of paradichlorobenzene, the operation of bait traps and the maintenance of sanitary measures in the orchards, roadside stands and packing houses may be adopted to advantage.

2. The introduction of parasites not native to this country, or by the special manipulation of native parasites; perhaps our most effective control.

3. The regular application of insecticides either as sprays or dusts.

4. The regular periodic removal and destruction of infested twigs and fruits throughout the growing season.

The most outstanding results to date have been accomplished by methods two, three and four. Workers, in general, after several years of intensive research in an effort to find an insecticide and a method of applying it to secure control, have been only partially successful and have lost much of the enthusiasm once shown for this approach.

The introduction of parasites from other countries or from other sections of this country for the control of the Oriental fruit moth has been a most important aid to the peach industry. However, there are certain localities in most peach growing areas wherein it has thus far been impossible to establish parasites or, if established, to secure any considerable reduction in the infestation of the harvested fruit. In such sections some other means of control is needed, at least until parasites become more effective. The harvest infestation records of several large commercial peach orchards in southern Indiana show that this peach insect is making the growing of this crop extremely hazardous. It also shows that neither parasites nor spray programs are giving the necessary aid in all localities. Each year harvest counts and infestation records are taken on the Elberta variety at harvest time in several large commercial orchards. In 1937 the average infestation amounted to 30.7 per cent, in 1938 the average infestation was 43.7 per cent and in 1939 the infestation was 31.7 per cent. There was no crop in 1940.

The practice of the removal and destruction of infested twigs and fruit at short intervals, beginning early in the season, to prevent a high harvest infestation, is a recommendation commonly made in Europe and Asia but until recently little studied in the United States. Most sources qualified to make suggestions on the subject have advised against an attempt at the mechanical control of the Oriental fruit moth. The reasons given have been varied, but usually the ones most often mentioned are that such a control practice would involve too much tedious labor and that the reproductive possibilities of the insect are so great as to preclude any hope of success.

In an orchard well situated for such a study records were kept of the effects of the clipping of twigs and the removal of infested fruit before harvest. This orchard was a 95-acre development and twig clipping was carried on as a regular orchard practice. In 1935, before the program was taken up, approximately 25 per cent of the peaches were infested. In 1936 there was no crop. In 1937 the average infestation was 6.1 per cent total infestation and 2.6 per cent visible infestation. In 1938 there was 1.5 per cent visible infestation. In 1939 clipping was carried on until the middle of June, when the number of infested twigs became small enough that the grower decided it would not pay to

(Continued on page 36)

A NATIONAL DEFENSE PROGRAM FOR FRUIT GROWERS

By R. S. MARSH
West Virginia University

What lies ahead for the fruit grower? How shall he prepare to meet the problems created by a national emergency? How can he best keep faith with himself, his family and his country? R. S. Marsh in his address before the Tennessee State Horticultural Society outlines for the AMERICAN fruit grower a program of preparedness which he can undertake as an individual as well as in group action. We herewith publish his message as required reading for every fruit grower so that he can think ahead and face the future unafraid.—EDITORS.

TODAY everyone is conscious of a national defense program. Individuals, regardless of whether or not they are subject to conscription, are wondering as to what will be their obligations and how they and their families will fare in the near future. Certain sacrifices will be made and many inconveniences endured, but all of these are justified if strong defense prevents the disasters of war in our country. Conscription and increased industrial activity are certain to cause a shortage of labor supply in some communities. Also, some materials probably will show a price increase. Taxes are scheduled for an increase in 1941, and it is possible they will be even greater than it is now indicated. Transportation facilities, especially railroads, will give priority to movement of defense materials and fruit growers can expect some delay on the receipt of their own supplies. Considerable shifts in population will temporarily tax our transportation system in areas near military cantonments and industrial centers with large defense material contracts. In addition, it is reasonable to expect a continued restriction of apple exports and a larger crop of apples and possibly peaches for 1941 than was produced in 1940. As you know, the odd calendar years during the past decade have recorded much larger apple crops than the even years due to the biennial condition of many apple orchards throughout the midwestern and eastern United States.

However, one optimistic possibility can be considered. The consumer's purchasing power can be expected to maintain its present level and will no doubt increase when some of the present unemployed men enter industry and training camps.

One economic authority has placed the unemployed population of 1940 at 8,500,000. He predicts 1941 will see 1,500,000 in army training, 3,500,000 in manufacture of defense materials, 2,000,000 in other industrial work, which leaves only 1,500,000 as unemployed.

Also, one of the policies of our Federal administration is to stress the improvement of national health in the defense program. Twenty-three years ago, it was, "Food will win the war." Soon we may have such slogans as, "Health is necessary for a strong defense," "Healthful bodies aid clear thinking in the defense of a democracy," "Health strengthens our nation economically, socially and physically." It is obvious that such a program will greatly aid fruit growers. You can well afford to tie your products to the tail of this kite of national health promotion. It is a worthy cause.

It seems advisable to discuss a national defense program for fruit growers under two sub-heads. First, what the individual grower can do, and, second, some suggestions as to group or co-operative action.

Individual's Program of Defense

Experience during the past 15 years has taught fruit growers to keep production cost down to the lowest possible level without lowering the quality and quantity of the product. There is no reason to abandon such a program at present. There are nine points of production and marketing which demand serious consideration in the fruit grower's program along a national defense plan.

1. Remove marginal trees.

In West Virginia this constitutes the "one cut method of pruning" which is being recommended for four classes of apple trees: (1) over-aged group, (2) unpopular varieties, (3) low-yielding trees due to poor location as to soil and site (this includes many abandoned and neglected orchards), (4) close-planted or filler-set orchards at an age where the trees are growing into each other.

No doubt you are familiar with some figures published by Ohio and Indiana on these economics of a tree removal program. For instance, Ohio estimates it costs from $2 to $8 per year to properly care for a mature apple tree. Now if you have trees that are not paying for this cost by fair yields of good quality, the question is how much will be the expense of removing these boarders and uneconomic producers?

To have something tangible to give you on cost of removing old apple trees and replanting the area, I am including some figures given by C. L. Burkholder, Purdue University, Lafayette, Ind., on their actual costs in removing 340 old trees and replanting with 335 new trees after properly reconditioning, fertilizing, and reseeding the area. The total cost as charged against the 340 old apple trees removed, including replanting and reconditioning the area, was about $1.55 per tree. The actual cost of removing and disposing of trees, filling stump holes and leveling was 68 cents per tree. Many orchardists can remove bearing trees for less.

Burkholder reports that during its last eight years this block of trees had gone in the red at a rate of $1.25 per tree per year. It was certainly time to hold court and bring condemnation proceedings, and the balance of the orchard will be cared for to far better advantage in future years with this dead weight removed.

I want to emphasize again that many commercial growers will spend *five times* or more per year on an old tree than it costs to remove it and replant with a new tree of a good variety, and remember that the smallest apple crops over the country have brought the most dollars with the least bushel costs in getting the crop to market. Removing unpromising old trees helps in two ways: first, it costs less to operate the orchard during the next year, and, second, you are contributing something to improving prices and demand for apples.

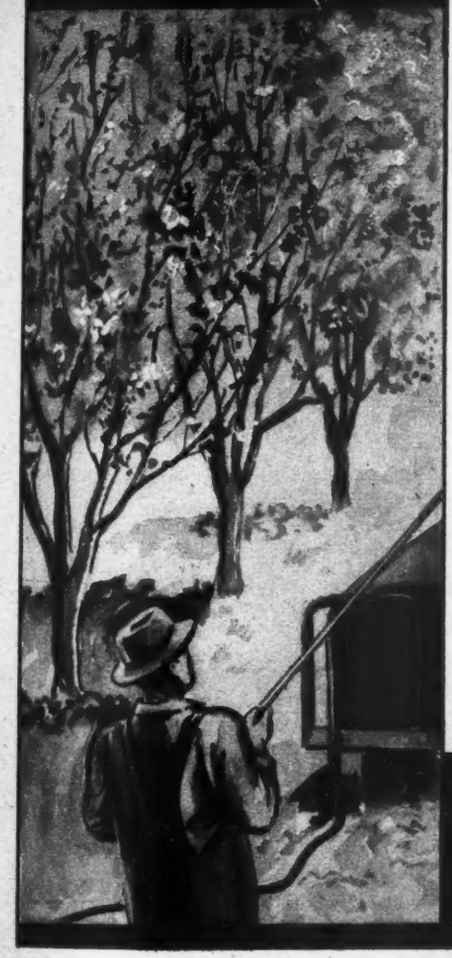
In a survey made of apple orchards in four counties of the eastern panhandle of West Virginia it was found that some 236,000 trees should be removed. This represents 15 per cent of the trees in West Virginia's most important apple-producing area. Since this survey was made four years ago it is probable that at present as many as 20 per cent should be removed. At least some of our best informed growers hope some 20 per cent of the nation's 86,000,000 apple trees will be removed in the next five years with the aid of the new Agricultural Conservation Program which allows a co-operator to earn up to $15 per acre.

2. Thorough pruning of mature trees.

Regardless of the type or kind of pruning you do this will reduce the amount of spray and fertilizer materials needed in 1941. If done correctly, it will go far toward helping to reduce the amount of off grade cheap apples which are always produced at a loss. As you know, a well-

(Continued on page 33)

Destructive Insects



BLACK LEAF 40

Aphids that deform fruit and foliage—leafhoppers that devitalize the leaves—red bugs, bud moths, and similar destructive pests—all these should be controlled before their attack reduces the quality of your crop and the future yields of your orchard.

Black Leaf 40 provides an economical counter-attack—for it can be combined with other standard sprays to add effective protection against these several pests. Use Black Leaf 40 to step-up spray programs.

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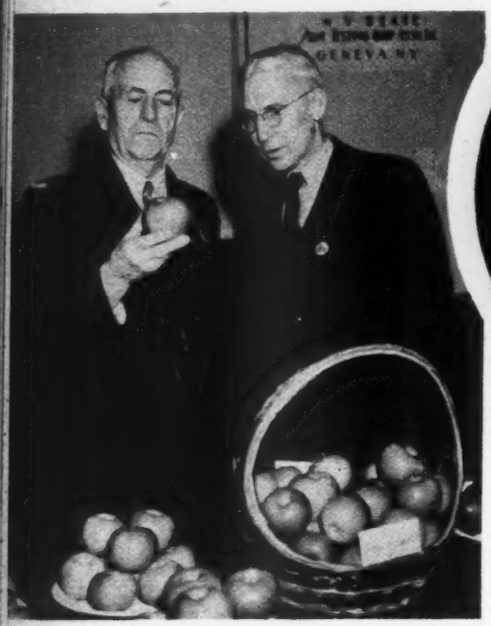
Black Leaf

CAMERA CLOSEUPS

AT ROCHESTER MEETING OF NEW YORK STATE SOCIETY

George A. Morse (left), Williamson, president of New York State Fruit Testing Association, examines a new fruit with H. L. King, Geneva, manager of the association.



Grant Hitchings, Nedrow, N. Y., for 46 years a member of the society, began to sell apples when he was eight years old and is still in the game.

Above, top—J. Wessel Ten Broeck, Jr. (left), Hudson, shakes hands with Roy P. McPherson, LeRoy, secretary-treasurer of the New York State Horticultural Society, while Dr. H. B. Tukey, Geneva, looks on. Above, left to right—R. W. Palmer, Ontario; C. H. McClew, Newfane; E. G. Cowper, Newfane; P. R. Morgan, Lewiston. Below, right—M. E. Buckman (left), Sodus Fruit Farm, Sodus, talks with Dr. A. B. Burrell (center), Champlain Valley grower and Cornell pathologist, and T. A. Cross, LaGrangeville.

AMERICAN FRUIT GROWER PHOTOGRAPHS

Large group, left to right—W. E. Thomas, North Rose; Marion Johnson, Williamson; James Case, Sodus; M. J. Cass, Ontario; F. H. Thomas, North Rose; Horace Putnam, Lyons. Below, left—Herbert P. King (left), Trumansburg, and E. Stuart Hubbard, Poughkeepsie. Below, center, left to right—E. G. K. Meister, publisher, AMERICAN FRUIT GROWER; Dr. P. J. Chapman, Geneva; Dr. D. M. Daniel, Geneva; and Dr. P. J. Parrott, director, New York Experiment Station. Below, right—R. P. Hunt (left), Clyde, and F. W. Beneway, Ontario, grower and vice-president, New York and New England Apple Institute.

STATE NEWS

NEW YORK—Growers attending the annual convention of the New York State Horticultural Society during the week of January 13 were agreeably surprised to find the meeting moved from Edgerton Park to Rochester's Main Street and next door to the Powers Hotel.

When the society was notified last summer that their old quarters would no longer be available, it was a serious question whether the convention could again be held in Rochester. The new Civics Exhibit Hall not only met all the requirements of the convention, but provided many new comforts and the very desirable winter convenience of a downtown location.

Feature of the convention was the fruit exhibit with 1800 plates of gorgeous red and bright yellow apples. More than 90 bushels of New York's choicest apples were displayed by 1047 entries and proved to observers that apples grown in New York rank in color, finish and size with those grown anywhere.

Prominent speakers discussed every phase of fruit growing, but interest was greatest in marketing and storing, in the discussions of which many growers participated. Dr. Larry Livingston of E. I. du Pont de Nemours & Co. was the principal speaker at the annual banquet and entertained with his famous bag of tricks of chemistry magic.

New officers elected for the ensuing year were Percy R. Morgan, president; Bruce P. Jones, Theodor Oxholm, Mark E. Buckman and Carl G. Wooster, vice-presidents. Members elected to the executive committee were Frank W. Beneway, Dr. A. B. Burrell, Rolland Reitz, Theodore E. Cross, Wilbur H. Schumaker and Marion C. Albright. Roy P. McPherson, on whose shoulders fell most of the work of moving this big convention from Edgerton Park to downtown Rochester, was re-elected secretary-treasurer.

LOUISIANA—A total of 23,000 acres was devoted to the production of strawberries in Louisiana last year, according to the Bureau of Agricultural Economics. This represents an increase of 3000 acres over 1939. The 1940 average yield per acre of 45 crates, however, was materially below the 10-year average of 64 crates per acre. Total production in 1940 was 1,035,000 crates which sold at an average price of $3.55 per crate, 35 cents higher than the price obtained the previous year.

Louisiana's 1940 yield of oranges totaled 224,000 boxes compared with an average 10-year production of 271,000 boxes. The peach crop for 1940 was 442,000 bushels over 1939 and almost double the 10-year average. Pear output was also stepped up in 1940, a total of 214,000 bushels being marketed as compared with 130,000 bushels in 1939 and a 10-year average of 115,000 bushels.

MASSACHUSETTS—The largest three-day attendance ever recorded by the association and the best meeting held during the past several years is the record attained by the Massachusetts Fruit Growers Association during its annual convention at Worcester, January 8-10.

The three days were packed with talks, pictures and discussions on fruit growing, especially apple production and marketing. The biggest one-day attendance in the history of the association listened to the production program.

Twenty-five local speakers, including State college and county extension service workers and fruit growers and six out-of-state speakers, including Prof. M. A. Blake of New Jersey, Dr. Oscar H. Hammer of New York, Dr. R. M. Smock of Cornell University and Prof. W. J. Tawse, Dominion market specialist of Montreal, took part in the program.

The many entries and keen competition in the Apple Show, which was revived after three years of inactivity, would indicate that growers are in favor of making the show an annual affair.

The slate of officers elected for 1941 is as follows: President, Arthur M. Howard, Pittsfield; vice presidents: R. A. Van Meter, Amherst; D. Walker Cheney, Brimfield; Hamilton Lincoln, North Brookfield; Donald L. Priest, Groton. Vice-president for the New England Fruit Show: F. C. Sears, Amherst. Member National Apple Industry Committee: John Chandler, Sterling Junction. In addition, 10 directors representing affiliated associations, 21 directors at large and five out-of-state directors were elected.—WM. R. COLE, Sec'y, Amherst.

APPLE RASPBERRY JUICE

In their effort to find new uses for surplus fruits, the New York Agricultural Experiment Station at Geneva has just introduced another new fruit beverage. It is called "Apple Raspberry Juice" and is a blend of the juice of black and purple raspberries with apple juice which has been extracted from sound, hand-picked and washed Baldwin and Cortland apples.

The juice is described as a pleasant appetizer or a delightful cocktail. It has a deep purple color and a full rich raspberry flavor which blends with the flavor of the apple juice to make something entirely new in the way of a fruit beverage.

Apple Raspberry Juice was introduced to the public in a chain store in Geneva and at the Rochester and Kingston meetings of the New York State Horticultural Society. It is expected that if consumers show sufficient interest canners will want to pack the juice on a commercial scale, with resulting benefit to fruit growers in opening a new outlet for their fruit.

Last year the station introduced a new cherry beverage which was called "cherry cocktail."

MARYLAND—Fruit growers of Maryland critically studied the condition of their industry at the 43rd annual meeting of their horticultural society in Hagerstown, January 8-9.

Experts in the fruit field, such as Porter R. Taylor, U.S.D.A.; H. W. Thurston, Jr., Pennsylvania State College; K. J. Kadow, University of Delaware; O. I. Snapp, U.S.D.A.; Truman Nold, National Apple Institute; L. P. Batjer, U.S.D.A.; A. L. Schrader, C. Graham and C. H. Mahoney, all of University of Maryland; and R. B. Corbett, Maryland Experiment Station, spoke to the growers on subjects ranging from packages to control of the peach borer.

Joseph G. Harrison, Berlin, was re-elected president of the society and S. M. Fulton and Dwight Walker were elected first and second vice-presidents, respectively. Elected to the executive committee were R. S. Dillon, Jr., Hancock; A. Lee Schrader, College Park; O. R. Higgins, Hurlock; S. B. Waddell, New Windsor; G. W. Gardenhour, Smithsburg; G. S. L. Carpenter, Hagerstown; G. Rust Canby, Silver Springs; L. Balderston, Colora.

Official business transacted by the society included the setting up of a legislative committee to work both at the State capital and at Washington in an effort to protect fruit growers' interests. The society also went on record as favoring national legislation to correct the cull problem because "Marketing of cull apples on the fresh fruit market has proved detrimental to the industry."

It was also resolved that every member of the Maryland society do all possible to push the apple tree removal plan.

VERMONT—Pointing out that deer are causing serious damage to Vermont orchards, the Vermont State Horticultural Society passed a resolution during its annual meeting on January 14 in Burlington requesting better co-operation from the State Fish and Game Service in protecting orchards against deer, and asked the Legislature to investigate the present deer laws to determine whether orchardists have a right to shoot animals damaging their property.

A Rutland County farmer recently shot two deer after 30 acres of young trees had been almost totally destroyed. The farmer was arrested and his case is now pending in the Rutland County court.

(Continued on page 39)

Wives of fruit growers took an active interest in the program of the New York State Horticultural Society meeting recently held at Rochester. Among those present were, left to right, Mrs. Grant Hitchings, Nedrow; Mrs. Charles Wilson, Hall; and Mrs. Roy P. McPherson, LeRoy.

APS

A PAGE CONDUCTED IN THE INTERESTS OF THE AMERICAN POMOLOGICAL SOCIETY

THE SPRAY RESIDUE SITUATION

SOMETIME ago we asked Dr. W. A. Ruth, chairman of the Spray Residue Committee of the American Pomological Society, to prepare a statement relative to the status of the new lead and arsenic tolerances which were announced in August, 1940. There are still those skeptics who believe that to raise the tolerance was untimely and that insufficient research had been carried out to establish a scientific basis for the new tolerances. The main criticism is believed to be due to the fact that the scope of the research work done is not fully appreciated.

This report by Dr. Ruth is presented because we believe that fruit growers and others will be interested in knowing the facts concerning the research work done by the U. S. Public Health Service, for this work was the basis for establishing the new tolerances on lead and arsenic.

H. L. LANTZ, *Secretary.*

FACTUAL REPORT OF SPRAY RESIDUE RESEARCH

By W. A. RUTH
University of Illinois

HORTICULTURISTS and entomologists have wanted and requested a comprehensive investigation of the residue problem ever since the arsenic tolerance was put into effect, because they knew, as the result of experience and investigation, that lead arsenate in all probability would remain a standard and necessary insecticide. No satisfactory substitute has been found up to the present time, in spite of an intensive search, although it is true that the discovery of a substitute has occasionally been announced.

In 1937, the U. S. Public Health Service undertook an investigation after they had been requested to do so by officials of the American Pomological Society. At the same time, and not at the request of this society, an investigation started a year previously by the Food and Drug Administration was discontinued by prohibiting the expenditure of funds by the U. S. D. A. for this purpose. The result was to place the federal research in the hands of the Public Health Service, while enforcement remained in the Food and Drug Administration.

The Public Health Service investigation has now been under way for three years, the minimum period originally allowed, and has been concluded, for the time being at least. As a result of this work, the lead tolerance on apples and pears has been raised twice, to .025 grain per pound from .018 grain per pound in September, 1938, and to .05 grain per pound in August, 1940, and the arsenic tolerance once, to .025 grain per pound (as As_2O_3) from .01 grain per pound in August, 1940.

These raises were made in advance of publication of the data upon which they were based. For this reason they have met with criticism by individuals who were unfamiliar with the plan of the experiment, its extent, and the nature of the data and, at the same time, with the urgency of the problems of the apple industry. The data cannot, as yet, be described; however, it is possible to describe the nature of the experiment and the effect of the raises on residue removal.

The first point of attack in the Public Health Service investigation was an examination of the individuals most seriously exposed. These were the apple growers in the Pacific Northwest, together with their families and employees. In this region spraying is more thorough than it is anywhere else in the United States; therefore, exposure to lead arsenate inhaled and ingested in spraying has been greatest. It has also been encountered there in the packing process. In this region, also, the ingestion of lead arsenate residue on apples has been greatest.

Between 1910, when lead arsenate first came into general use, and 1926, there were no tolerances, so that orchardists and their families in this and other regions ate unwashed apples, and this practice is still not uncommon in the Northwest and elsewhere. The study of individuals so thoroughly exposed, and for such a prolonged period, has the advantage of using human subjects as laboratory material, which would not be otherwise practicable, at least on such a large scale.

In September, 1939, the Public Health Service experiment was described as follows in a letter prepared for publication by Dr. R. R. Sayers, chief of the Division of Industrial Hygiene:

"The Wenatchee observations," stated Dr. Sayer, "were discontinued about May 15, 1939, insofar as the clinical work was concerned. A total of 1231 individuals were examined, subdivided as follows: Orchardists—546; consumers—335; intermediates—330; and special consideration—20. The subjects ranged in age from less than two years to about 90 years. One hundred and twenty-five were children under 15; 419 were females; and 812 were males. Approximately 350 persons have been exposed to lead arsenate spray residue mixtures for more than 10 years in the course of orchard activities, as well as ingesting lead on unwashed fruit, and quite a number have used this insecticide for more than a quarter of a century. One thousand and four individuals were given two examinations and 359 three examinations. Various conditions arose in the course of the field work which made it impracticable to examine a number of the individuals as many times as originally planned. However, it was possible to observe clinical response of the subjects to varying amounts of lead arsenate throughout one entire year.

"Blank schedules were used in recording some of the medical observations. Questions as to the amount of milk consumed and other dietary items were included under 'Habits.' The details of the orchard exposure to insecticides were indicated by the items under 'Orchard Work History.'

"With reference to laboratory work, the usual routine tests were made of the urine and 250 cc. of urine was obtained on each subject for chemical analysis of lead and arsenic content. Twenty cc. of blood was drawn from most of the subjects by venipuncture; 12 cc. of this was placed in a Pyrex glass ampoule and sealed off by drawing out the glass in the flame of a Meeker burner. This sample was analyzed for lead content by the dithizone technique. Blanks of lead-free distilled water were introduced into another ampoule and treated in the same way as the blood sample. Two blanks of this type were prepared during each day's work, and were analyzed simultaneously with the blood samples in order to have a measure of contamination by lead arising from the syringe, needle, etc. The remaining 8 cc. of blood was used for serology and for making erythrocyte counts, hemoglobin determinations, and blood smears stained by three methods, Wright's, Sussmann-Weindl, and vitally stained for reticulocytes.

"The heart and lungs of each subject were studied by fluoroscopy. Chest roentgenograms were made about every tenth case, unless specific pathology was observed during other portions of the clinical examination.

"In addition to these routine observations, an experiment was carried out with nine men who ate and had been eating unwashed fruit which had been sprayed with lead arsenate. Samples of the fruit eaten by these subjects were analyzed for lead and arsenic content, and their 24-hour output of lead and arsenic in the urine and feces was studied. This experiment was to supplement the observations made by Neal and Fairhall, reported in Reprint No. 1960 of the Public Health Reports.

"I trust that the above information is approximately what you looked for. Sincerely yours, (Signed) R. R. Sayers, Senior Surgeon, Chief, Division of Industrial Hygiene."

The medical examination, as shown by the blank form to which Dr. Sayers refers, is designed to record all information of every sort that can have any bearing; in addition, there is a blank to record orchard work history and interval history. I am sure that everyone hopes that this investigation, because it deals directly and comprehensively with the problem at hand, will provide sufficient information to eliminate any hazards that may exist in the use of lead arsenate, and any hazards to which the public may be exposed in the

(Continued on page 32)

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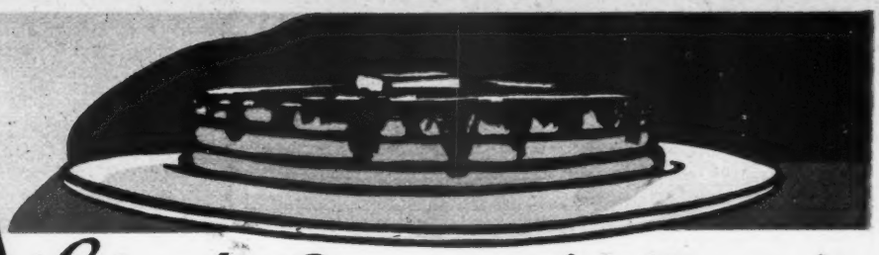


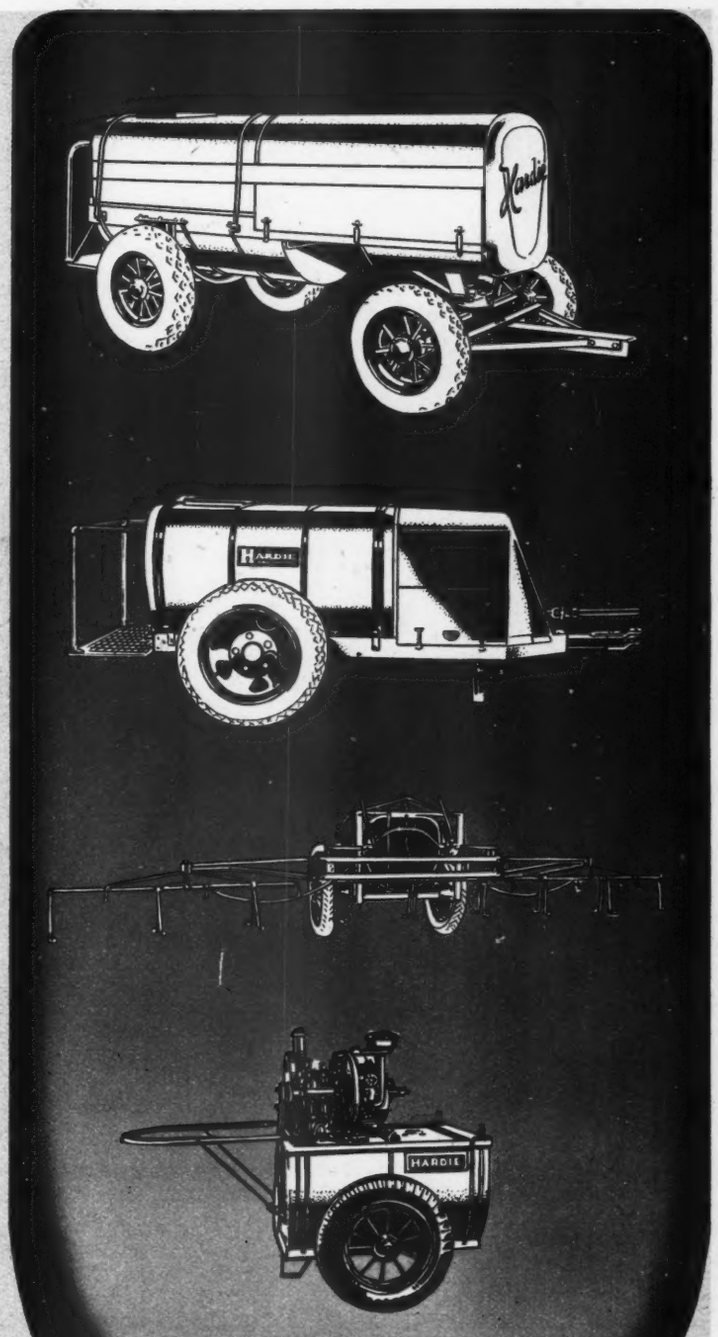
Like the Syrup on the Pancakes

Buy a Hardie and get more for your money. What a whale of a difference between a Hardie and any other sprayer in labor saving, time saving and money saving.

Hardie gives you a bigger, stronger pump than any other of equal rating, a vertical crankshaft drive that saves power and wear, complete lubrication of each and every moving part. Even the plungers, cups and cylinder walls run in a bath of oil. Slow operating speed saves wear. Coil-in-tank cooling eliminates troublesome radiator and permits complete dust proofing. Responsible dealers everywhere give quick, economical, low-cost service to growers.

7 PLUS *Features*

Look at a Hardie. Compare it point by point with any other. See the great big measure of plus value you get for the sprayer dollar when you buy a Hardie. Write for catalog showing streamlined portables in a wide range of sizes and models, Tractor Trailers and motor truck mounted outfits in all sizes, a complete line of row crop sprayers. The Hardie Mfg. Company, Hudson, Mich., Portland, Ore., Los Angeles, Calif.



HARDIE *Dependable* **SPRAYERS**

"THE ONLY SPRAY PUMP THAT IS COMPLETELY LUBRICATED"

6 POUNDS NET CODE 323
KOLOFOG
WHEN YOU BUY Niagara YOU BUY PROTECTION
A BENTONITE SULPHUR PRODUCT
NIAGARA SPRAYER AND CHEMICAL CO. Inc.
Middleport, N.Y.

TEN REASONS WHY YOU SHOULD USE KOLOFOG

1 EFFECTIVE—An efficient fungicide for Apple Scab, Brown Rot and similar plant diseases. Usage shows Kolofog to be toxic to certain fungi where ordinary Sulphur materials fail to control; i.e., Cedar Rust and Peach Canker.

2 SAFE—Non-caustic, permits leaves to function normally.

3 PERSISTENT—Adheres and furnishes protection under adverse conditions when protection is most needed.

4 COMPATIBLE—May be combined in the same application with practically all commonly used spray materials. No objectionable black sludge results when used with Lead Arsenate.

5 LOW SULPHUR CONTENT—A desirable factor that reduces possibility of injury during hot weather when a Sulphur fungicide is required.

6 CARRYING AGENT—Kolofog imparts sticking and suspending properties to other materials, such as Lead Arsenate, when used with them.

7 DISPERSIBLE — Readily disperses in any kind of water, and remains in suspension.

8 A FIXATOR—No other material containing Sulphur has the property of acting as a fixator for Nicotine Sulphate.

9 CONVENIENT—Packed in handy six-pound bags, eight to the carton. Does not deteriorate in storage.

10 RE-ENFORCEMENT AGENT — Kolofog plus Lead Arsenate and Nicotine is the ideal non-caustic combination for use against heavy Codling Moth infestations during peak brood sprays, because it improves the adherence of Lead Arsenate, and "fixes" and prevents quick liberation of Nicotine. NO OTHER SULPHUR SPRAY OFFERS THIS DISTINCT ADVANTAGE.

San Francisco, California — WHEN YOU BUY Niagara YOU BUY PROTECTION — Jacksonville, Florida

Niagara Sprayer and Chemical Co., Inc.
MIDDLEPORT, NEW YORK
Canadian Associate, Niagara Brand Spray Co., Ltd., Burlington, Ontario

"THEY GOT ME!"

THE TRUE CONFESSION OF A WILDCATTING WASHINGTON FRUIT GROWER WHO IN 1939 THOUGHT HE HAD A NEW AND NOVEL SPRAY PROGRAM THAT WOULD MAKE THE SCIENTISTS SIT UP AND TAKE NOTICE BUT WHO FOUND WHEN 1940 ROLLED AROUND THAT HE WAS MERELY RUNNING AN OPEN AIR CAFETERIA FOR THE CODLING WORMS.

•

AT HIS OWN REQUEST: "PLEASE OMIT FLOWERS."

By JESSE C. CHILDS

IN the issue of AMERICAN FRUIT GROWER for February, 1940, was an article telling of my use of a spray program for the control of the codling worm, consisting of arsenate of lead, rotenone and stove oil, together with spreaders. The article reported remarkable results: (1) unusual control, accomplished by (2) a minimum of applications, accompanied by (3) control of sucking insects and (4) unusually good size and color.

Now comes a request for a report on the result of the trial of the program in 1940. It would give me the keenest pleasure to announce a repetition of the success of 1939, but truthfulness will not permit this. I began the season with great confidence. It was my firm belief that I "had something." If this had been the case it would have been a great boon to the apple and pear industry. I would have been hailed as a benefactor and undoubtedly a marble monument would have been erected to my memory. So it is with the deepest chagrin that the report must be one of failure. Up to July 1 it appeared that success would be repeated, but after that time the worms moved in and did great damage. It may be said in passing that such was the experience of many if not most apple growers whatever the spray program used. The worms were unusually active and successful in the later part of the season.

The program of the year before should have been exactly duplicated, but unfortunately a change or two was made in what seemed unimportant matters. This may or may not have had some part in preventing success. In 1939 a certain soap spreader was used; in 1940 another was substituted which may have been more alkaline (alkali is incompatible with rotenone). What is worse, my spray hands, without my intention, used far too much of the spreader in a spray early in July with the result that the rotenone was certainly alkalied and the lead largely ran off. This left the apples with little protection at the beginning of the second brood, and the worms seized their opportunity. Subsequent correction of the spray program failed to check them.

In another respect the 1940 practice differed from that of 1939. In 1939 one conventional oil-lead spray was used, in 1940 there was none. One can only speculate on what difference this may have made in the results.

Perhaps there would have been more success if it had not been for these deviations from the method of 1939. In truthfulness it must be said that it is not my belief that an exact repetition of the 1939 program would have repeated the success. Dr. W. J. O'Neill of the Tree Fruit Experiment Station at Wenatchee, Wash., tried my 1939 method and reports bad results. The manager of extensive orchard holdings in Wenatchee reports that the rotenone program held the worms until September 10, but that after that date they did much damage. How strange that a program which was successful until nearly picking time should suddenly fail!

I was at a loss to account for the success of 1939 and am at as great a loss to account for the failure of 1940. There are contradictions not easily explained. I have a block of Bartlett pears not far from the apples. They were sprayed with the lead-rotenone, and the crop was very clean, the best for years. By another contradiction there is a row of Anjou pears between the apples and Bartletts. These, picked a little later than the Bartletts, were quite wormy.

It should be mentioned that the use of rotenone with lead seems to prevent a good deposit of lead. Whether this was more true in 1940 than in 1939 is not known.

As before, the rotenone proved its worth in controlling all kinds of sucking insects such as aphids and mites.

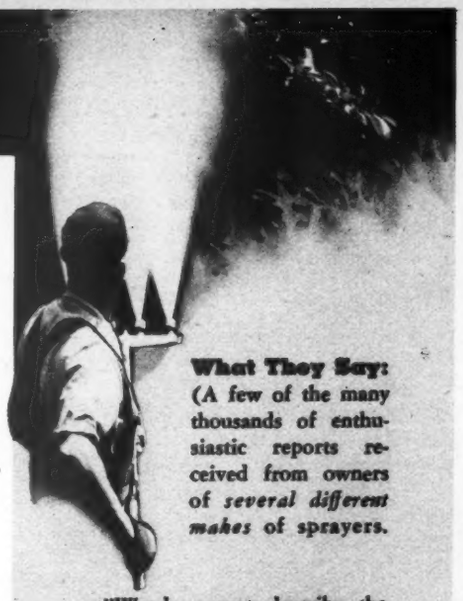
(Continued on page 35)

First— ask growers who have OWNED THEM ALL—

Before you buy a sprayer, talk to fruit growers who have owned *several different makes.*

Until you do this, you can not realize what an immense improvement the "Friend" will make in your spraying.

Thousands of successful growers will tell you: "To be sure of Steady High Pressure and Dependability, buy a 'Friend'."

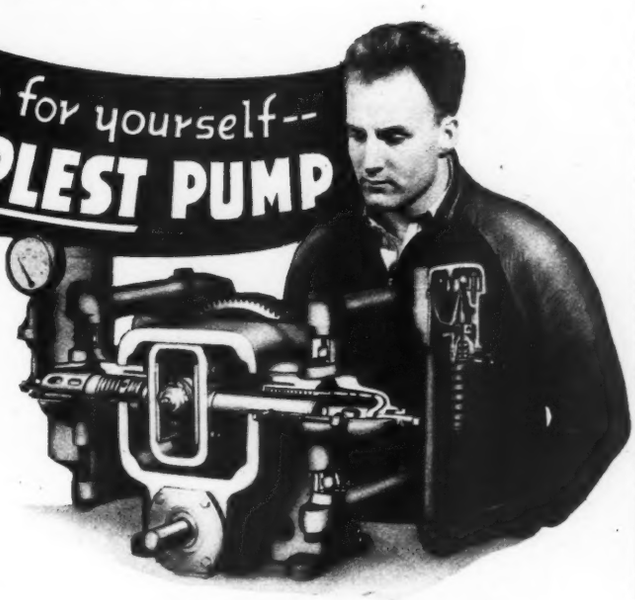


What They Say: (A few of the many thousands of enthusiastic reports received from owners of *several different makes* of sprayers.

"Words cannot describe the difference between my 'Friend' and other sprayers. I can do more work—and a ten-year-old boy could understand its working parts" . . . "Of our four different makes of sprayers, the 'Friend' has given steadiest performance and least trouble" . . . "The strong simple construction of the 'Friend' makes it the cheapest and easiest to operate."

Names of the above owners—and more reports from prominent growers—are given in the new "Friend" Catalog. Also a clear description of the Most Reliable and Economical sprayer pump ever built. Mail the Coupon below.

then size up for yourself— THE SIMPLEST PUMP



You will see why the owners of "Friends" are getting better results, when you inspect a "Friend" pump.

Only ½ to ⅓ as many moving parts as other spray pumps. No crankshafts or connecting rods. No wrist pins. No plunger cups. And—

No wear whatever on the cylinder walls, because the plungers do not touch.

Every part is easy to get at. Valves and controller are outside, for instant cleaning. Timken Roller Bearings —not one plain bearing on any "Friend" Pump.

Sprayers of Any Size— Any Chassis Style

Capacities 5 to 70 gallons per min. Pressures up to 1,500 lbs.

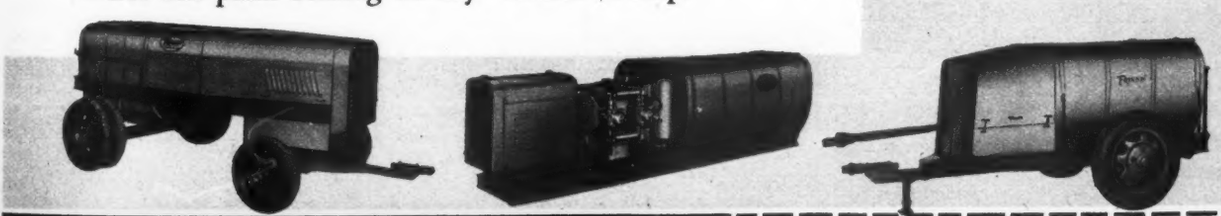
All types of mountings, including Combinations, Estate sprayers, and the three popular styles shown below:

Cut-under, with short-turning 4-wheel trucks.

Skid-Mounted sprayers for use on motor trucks.

Tractor-Trailer sprayers, with pump driven by the tractor.

Mail the Coupon for the new "Friend" Catalog



"FRIEND"

• SPRAYERS ••• DUSTERS •
FRUIT SIZERS & CLEANERS

"FRIEND" MFG. CO., Gasport, N. Y.

Send your 1941 Sprayer Catalog, explaining the "Friend" pump and showing all types of mountings, to

Name .....

Address .....

(I have..... acres of.....)
(Kinds of fruit)

SOME PRACTICAL INFORMATION ABOUT

DORMANT SPRAYING

PERTAINING TO THE CONTROL OF ROSY APLE
EUROPEAN RED MITE • SAN JOSE SCAE •

Did you ever stop to think about the fact that even when target shooting you're careful not to waste ammunition—you try to make every shot count.

The same thing should be true with regard to your program for dormant spraying. If you go at it blindly it's pretty costly because you're wasting good ammunition. Since it's an expensive type of spraying operation, at best, isn't it just good common sense to find out first what you're shootin' for . . .

Generally speaking (with the exception of peaches in certain areas), San Jose scale is no longer a serious problem and, therefore, it isn't necessary to apply a dormant spray for the control of this particular pest in every orchard every year.

There are certain pests, however, that are always ready to cause serious damage to apples. Dormant spraying is highly important in getting the drop on these skulking enemies. For example, there are the green and rosy aphis that winter over in the egg stage on the bark of twigs and branches, and there is also the European red mite. In the past growers undertook to control aphis with expensive nicotine sprays applied during the growing season. Such nicotine sprays prove extra costly because during the growing season there are, of course, large areas of foliage which must be covered with spray, consequently large quantities of spray are required.

The European red mite is difficult to control in the summer, and expensive too, because summer oil emulsions are only partially effective and, therefore, they are costly in the same way that nicotine sulfate proves costly.

In the case of apples it has been found that dinitro-ortho-cresol, properly compounded and combined with oil emulsion and applied as a spray when the trees are strictly dormant, will destroy the eggs of rosy and green apple aphis and those of the European red mite and also overwintering San Jose scale.

This is a distinctly new development and Sherwin-Williams recommends it to every grower's serious attention.

Tar oil emulsions have been used in the past but have always had the handicap of proving dangerous to the user because of their toxicity. Dinitro-ortho-cresol mixtures, however, are less toxic and are definitely not as irritating to the skin or eyes of the operator. They are also relatively inexpensive, yet very effective.

The Sherwin-Williams Company has developed a dry

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Photograph by Caterpillar Tractor Co.

APLE APHIS • EARLY GREEN APPLE APHIS • SCALE • PEAR PSYLLA • AND PEACH LEAF CURL

mix known as Dinitrol containing dinitro-ortho-cresol which we recommend with our own oil emulsion, known as S-W Free-Mulsion, or with any other standard, properly-made oil emulsion. If applied thoroughly it will practically obliterate the overwintering brood of eggs and at the same time will also eradicate San Jose scale, thus giving a clean orchard when spring operations start.

A great many growers have been accustomed to applying a delayed dormant application (that is, when the first leaves show green) but it should be pointed out specifically that S-W Dinitrol must be applied when the trees are absolutely dormant because, being a powerful insecticide it would injure the new growth.

If you grow pears and have been bothered with pear psylla, the simple way to control this condition is to use a petroleum oil emulsion such as S-W Free-Mulsion, alone, 3% strength, applied when the trees are dormant. It isn't a complete control but it will reduce the infestation to a point where very little spraying will be required in the summer time with nicotine. In fact, if you use S-W Free-Mulsion it may not be necessary to use nicotine at all in some seasons. . . .

When it comes to peaches, most orchards have San Jose scale and peach leaf curl to control. If you have only San Jose scale to contend with, use S-W Free-Mulsion before the buds swell.

Experience has shown, however, that peach leaf curl is apt to appear, if only occasionally. Therefore, the really practical thing to do is to spray for it, because you never know when an outbreak of it will develop. If you have San Jose scale in your orchard and there is a possibility of peach leaf curl coming in, use a combination of S-W Dry Lime-Sulfur in S-W Free-Mulsion. This gives a very economical and safe combination. If you have no trace of scale and it is not usually a problem, use the Dry Lime-Sulfur.

By being practical about your dormant spraying it just stands to reason that you will almost eliminate your summer spraying problems in so far as certain insect pests are concerned. And that's what we'd call good spraying practice.

We invite you to write us about your spraying program and problems. We are in a position to give you the most up-to-date, complete and practical advice, and this we will gladly do at any time and promptly, too!

THE SHERWIN-WILLIAMS CO.
Insecticide Dept.
101 Prospect Ave. Cleveland, Ohio

ADVERTISEMENT

Will the raised tolerance affect your spray schedule?

HERE ARE A FEW SUGGESTIONS:

For Better Codling Moth Control With A NON-WASH *Program*

● You can use more lead arsenate before you start with Nico-Sol. We cannot recommend a complete, heavy lead schedule where a non-wash program is being followed, but you can use a larger number of sprays and stronger dosages of lead in early season applications.

However, for a safe Non-Wash Program, NICO-SOL SUMMER SPRAY OIL will continue to play an important part, due to the fact that even with the raised residue tolerance, a *full* arsenate of lead schedule cannot be used in most cases to give adequate protection without going over the allowable tolerance.

FOR YOUR OWN PIECE OF MIND—unless you want to wash your apples and are equipped to do so, don't take a chance on having to add extra trouble and expense to your spray costs. Continue to use Nico-Sol in the later sprays. It has been tested and proved under strenuous conditions since its inception in 1936.

. . . and with a WASH program—You can now use Superla Summer Spray Oil right along with lead in the most important early season sprays to obtain exceptional protection against codling moth injury—and without any fear of failing to remove excessive residue successfully.

FOR CONTROL OF OTHER INSECT PESTS—the use of Nico-Sol in a non-wash codling moth control program has proved to be fully effective for control of apple leafhoppers, red mite, red spider and pear psylla. For example, every pear grower that used it in 1940 enthusiastically agrees that Nico-Sol is the best all-round summer pear spray tried to date. Psylla just doesn't develop on Nico-Sol sprayed trees.

You get all these additional values—often mighty important ones—when you adopt the Nico-Sol program.

NICO-SOL COSTS LESS TO USE!

Try it in your own orchard and keep a record of costs and results. Compare the figures with other non-wash schedules or a part of your orchard kept on the old schedule, and see what protection you get for such low cost!

Following are some advantages found in NICO-SOL SUMMER SPRAY OIL:

1. No arsenical injury
2. Fewer sucking insects
3. Better foliage
4. Lower costs
5. Production of larger, better-finished fruit

OTHER PROVED STANDARD OIL COMPANY SPRAY OILS

Dendrol Dormant Spray Oil—The best-known general purpose, highly uniform dormant spray oil.

Standard Aphid Spray Oil—A positive dormant, one-application aphid control—with a wide range of control of other pests, such as red mite, scale and psylla.

Superla Summer Spray Oil—Ideal for use with arsenate of lead, fixed nicotine and nicotine sulphate.

Write for your copy of the booklet "Facts for Fruit Growers About Standard Oil Company Spray Oils," with no obligation to you.

STANDARD OIL COMPANY (INDIANA)
910 SOUTH MICHIGAN AVENUE, CHICAGO, ILLINOIS

HARVEST SPRAY SURVEY

(Continued from page 11)

Apples were picked seven days later than unsprayed trees which gave most growers (68 per cent) an increase in color and about the same number an increase in size. One grower reported the eating quality was materially improved by the use of the spray.

Growers who reported good to fair results saved from one and one-half to two and one-half bushels from dropping by using the spray. Seven per cent of the growers found their apples difficult to pick.

Rome Beauty

Growers reported excellent results with Rome. Eighty-seven per cent obtained good results and 13 per cent fair results, with no growers reporting poor results.

The spray was applied on the average of 10 days before Rome usually ripens and most of the growers reported no dropping of apples before spray was applied. Apples were picked about six days later than usual and a majority reported increased color and size. Growers saved about two bushels by applying the spray and most reported apples were not difficult to pick.

Grimes Golden

Results with Grimes were not as good as with Rome. One-third reported good results, one-third obtained fair results and one-third termed results poor. The spray was applied by those who reported good to fair results an average of seven to nine days before the variety usually ripens. Those who obtained poor results applied the spray about three days earlier than the variety usually ripens.

Apples were picked about 10 days later than usual and about half the growers reported an increase in size. Growers estimated they saved about two and one-half bushels from dropping by applying the spray to Grimes. Apples were not difficult to pick.

Jonathan

Forty-four per cent of those who sprayed Jonathan apples reported good results, another 44 per cent reported fair results and 12 per cent obtained poor results. Those who obtained good to fair results applied the spray five to six days before Jonathans usually ripen.

Jonathans were picked up to 12 days later than usual and one-third of the growers reported an increase in color and more than half reported an increase in size. Growers were unanimous in saying apples were not difficult to pick.

One Jonathan grower reported 10 bushels picked, 20 bushels dropped,

and no bushels saved from dropping. He explained this by saying, "This block of trees was very weak from the past several years of drought and foliage was very poor, in fact, most trees lost 80 per cent of their leaves before we sprayed." This clearly indicates trees must be in good vigor if they are to respond to the spray.

Williams

Williams received universal acclaim from growers as being a variety that responds exceptionally well to the Harvest spray. All growers reported good results and all growers reported an increase in color. One grower wrote, "By using the Harvest spray we were able to increase grade from commercial to fancy and the price from $1 to $1.50 wholesale."

Most growers reported satisfactory results with the spray this year indicating, on the whole, it has been a success. Those who were disappointed with the spray obtained poor results mostly because they failed to apply the spray at the proper time. It must be applied before the cells in the stem begin to separate if it is to stop dropping. If the spray is applied too late—as was the case with many growers who reported poor results—money spent on spray material is wasted.

Thoroughness of spraying is also important. However, growers who obtained poor results were less guilty of careless spraying than they were of improper timing. Spraying from towers so that the spray is directed down into the tree to hit the stem end should improve the effectiveness of the spraying. One-half gallon for each year the tree is old seems to be sufficient amount of spray material.

Spraying trees partially defoliated, weakened by drought, or old and low in vigor gave poor results.

More of the nation's apple growers will use the Harvest spray next year and will benefit from the experiences of the growers who pioneered this year. With the experiences of each season, more and more will be discovered until Harvest spraying to increase yield, color and size is standardized and becomes a routine orchard procedure.

Establishment of roadside reporting stations as a means of obtaining needed information on movement to market of fruits and vegetables by motor truck is being considered by marketing officials of the U.S.D.A. Before the days of heavy truck movement, reports upon rail and boat shipments and market arrivals gave an adequate picture of supplies. With the swing to more of the fresh fruit and vegetable tonnage moving by truck, reports upon rail and boat movement no longer suffice to supply that information completely.

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Myers new Silver Spray power gun is so light to handle, so quick on the trigger, and so easy to adjust that it puts new ease and speed into your spraying job. New pistol type grip and convenient adjusting handle give you a firm double hold — with hands and arms in a natural, uncramped position.

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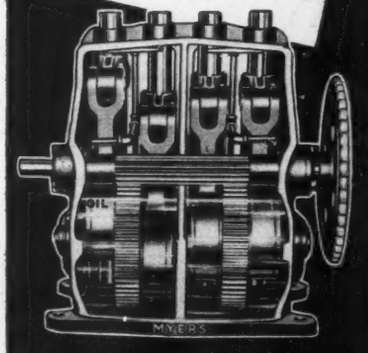

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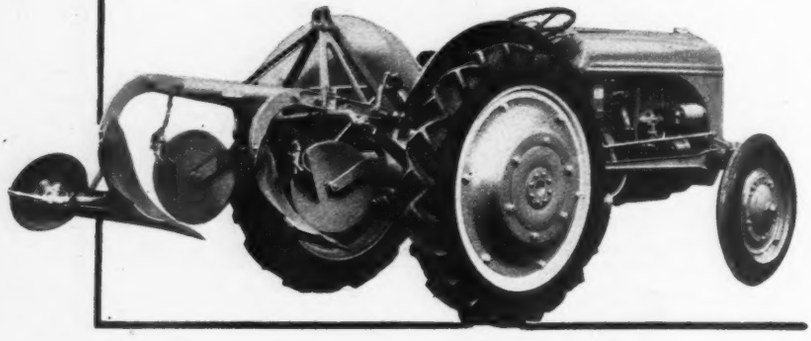

GETS *ALL* YOUR WORK DONE ON TIME

STATE EXPERTS REPORT ON HARVEST SPRAYS

(Continued from page 12)

In addition to five commercial preparations, the Ohio Experiment Station also used a home-prepared naphthalene acetic acid. In the experiments at the station, the major part of the experimental work was with Jonathan, Baldwin and Stayman. The solution was applied at two different periods of weekly intervals on each variety. The results on these three varieties may be summarized as follows: Jonathan sprayed plots showed eight per cent windfalls as compared with 19 per cent on the check plots. The sprayed Stayman trees had 20 per cent drops while the unsprayed trees showed 38 per cent. Baldwin showed no beneficial results regardless of whether one or two applications were made. McIntosh responded to the treatment better than the winter varieties. Good results were obtained with some summer varieties. Best results were secured when the solution was applied within three or four days from the time harvest normally would have begun. Heavy applications of solution are required for a good coverage.—C. W. ELLENWOOD, Ohio Experiment Station.

INDIANA

WHEN applied to the open flower, sprays of growth-promoting substances reduced set of Starking apples, but when used as a harvest spray they delayed drop of mature apples. The set of Starking fruits was reduced one-sixth by an application of spray containing 0.001 per cent a-naphthyl acetic acid; three-fourths by a 0.005 per cent spray of the same acid; and one-third by a spray containing 0.005 per cent of a-naphthyl acetamide when these sprays were applied to the open flowers. Severe injury to immature foliage followed the use of the stronger acid spray. Commercial harvest sprays containing the equivalent of 0.001 per cent a-naphthyl acetic acid did not materially reduce the drop of McIntosh or Jonathan apples, but reduced the drop of mature Delicious and Rome fruits 55 to 75 per cent.—C. L. BURKHOLDER and MONROE McCOWN, Purdue University Agricultural Experiment Station.

NEW HAMPSHIRE

OUR first use of the hormone sprays was on such early varieties as Early McIntosh, Melba and Duchess. The material was quite effective. Since these varieties deteriorate rapidly in hot weather, they soon showed an overripe, soft condition, but they stayed on the trees. Records compiled from information received from 21 growers who tried various brands of hormone sprays showed a total of about 40,000 gallons of the spray had been used in their orchards. Average age of the trees was 20 years and the average per tree application 10.1 gallons. Nine growers sprayed from the top of the rig, nine from the ground and three used both methods. Only one used a spreader, 17 had unsprayed trees near by and 15 had used borax. Number of days between spraying and picking ranged from five to 11 and averaged eight. Figures furnished by one grower showed a marked increase in the percentage of fancy McIntosh from the hormone sprayed block compared with the unsprayed area. From the unsprayed block the percentage of fancy fruit ranged from 49.6 per cent to 63.5 per cent. From the sprayed block, picked a few days after the unsprayed, the percentage of fancy fruit ranged from 73.2 per cent to 82.2 per cent. Seasonal conditions were not right in New Hampshire to give the material a real test.—C. O. RAWLINGS, University of New Hampshire.

Truman Nold, secretary of National Apple Institute, explaining details of winter health apple sales plan to Grower R. C. McDonald, Shippensburg, Pa.

WOULD KEEP ALIEN APPLES AND PEARS OUT OF DOMESTIC TRADE

MEETING in Washington January 6 and 7, the National Apple Institute and the National Planning Committee discussed imports of fruit, sales of cold storage holdings and apple by-products.

In order to set up a method of procedure for dealing with possible imports in the future, the National Planning Committee by unanimous vote passed a resolution that any apples and pears to be imported be purchased by the Surplus Marketing Administration at their source of production or at point of entry and thus be diverted from domestic trade channels. Another resolution asked that only products grown in the United States be used under the Stamp plan. Until now, imported apples have been included with domestic apples.

The National Apple Institute has scheduled two special sales drives on apples for the weeks beginning January 30 and March 13. The first drive is a winter health apple sale and the second is a variety sale in which one prominent variety in each section will be featured. According to Truman Nold, manager of the National Apple Institute, over 150,000 grocery stores will take part in the drive.

The reason for the two sales is the large amount of cold storage holdings as compared with a year ago. According to estimates, over two million more bushels were in storage January 1 than a year ago. This supply of apples in storage on January 1 is the greatest ever held on that date for domestic consumption, which means that more apples must be moved between January 1 and the end of the season than ever before. General outlook is optimistic, however, since consumer buying power is up 15 per cent over last year.

Apple by-products were also discussed at the meeting. Object was to broaden grower's interest in by-products. Dr. J. J. Willaman and Dr. H. H. Mottern, chemists in charge of apple work at the new Philadelphia Research Laboratory of the U.S.D.A., were present at the meeting. It is hoped that the government may be persuaded to put up credit for growers who wish to erect by-product plants.

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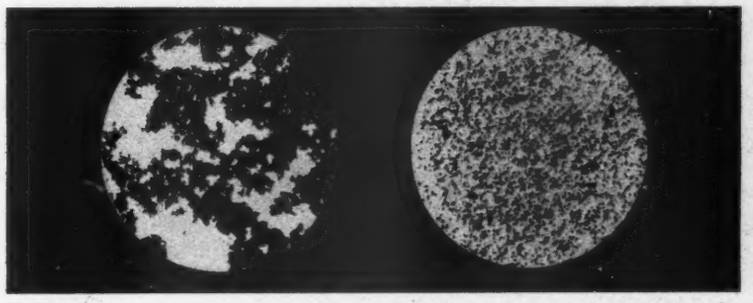
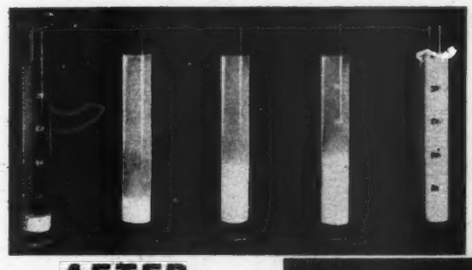
SPREADS AS IT SPRAYS?

DU PONT NuREXFORM is a superior insecticide because it spreads as it sprays—you don't have to add other spreaders to achieve even coverage. Compare the photomicrographs below. NuREXFORM is also more effective and easier to apply, because it stays in suspension—thus avoiding clogged screens and nozzles and providing uniform strength from the spray mixture.



NuREXFORM's positive spreading action shown under a powerful microscope. Ordinary lead arsenate (left) leaves a splotchy film . . . while (right) you can see the compact NuREXFORM film of poison which assures even coverage.



NuREXFORM (in tube at extreme right) and four of the better known lead arsenates, two minutes after being shaken into suspension. Note how NuREXFORM STAYS in perfect suspension while other leads have settled or are rapidly settling.

AFTER TWO HOURS

NuREXFORM (in tube at extreme right) is still in suspension. Other lead arsenates have settled to the bottom in a compact mass leaving the water practically clear and useless as a spray.

With DU PONT NuREXFORM, you get even coverage over foliage and fruit. And you can do two jobs at one time when you want to use Lime Sulfur, because NuREXFORM mixes readily with Lime Sulfur without sludge formation. You get a uniform spray out of your tank.

Plan to build your spray program around NuREXFORM, the lead arsenate preferred by thousands of growers. See your supplier today.

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Because apples in Lenonet Bags have greater sales appeal, retailers automatically give them *choice display positions.* And, as a result, these attractive consumer-size packages exert their *full sales power* on shoppers, increasing both the number of sales and the size of individual purchases. Thus growers and shippers using Lenonet get a *greater share* of the market.

Bemis Lenonet Bags are *easy* and *economical* to pack. Shipping costs are *lower.* Fruits reach the retailer in *better condition.* These advantages, added to their selling force, make Bemis Lenonet Open-Mesh the *key to profits* for growers and shippers.

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NEW FACTS ABOUT OIL SPRAYS

(Continued from page 9)

mixture. More recently still was the introduction of the tar oils, used alone and combined with petroleum oil. This brings us down to efforts of the present and which date back only three or four years, namely, studies of the nitro compounds, their use separately and with petroleum oil. I believe our present information on the nitro compounds and with nitro compounds added to oil can best be summarized in tabular form. Such a summary is given in Table 1.

The specific compounds referred to in speaking of "nitro compounds" are: dinitro-o-hexylphenol, dinitro-o-cresol and sodium dinitro-o-cresylate. All are effective at the proper concentration where so indicated in Table 1. There is an indication at present that the cresol compounds should be favored over the dinitro-o-cyclo-hexylphenol because a lesser tree injury hazard may be involved.

As will be seen in Table 1, our best present hope of finding the ideal dormant or semidormant treatment would seem to be in the direction of the use of a petroleum oil spray to which one could add, as described, some toxic substance to supplement the action of the oil. So, basically, most dormant or semidormant spray treatments will be oil sprays—oil alone or oil plus additional toxicant.

Our recent studies have shown that there is a rather direct relation

TABLE 1—Present Status of the Use of Oil and Nitro Compounds in Dormant Spray Treatments for the Control of Various Apple Pests.

Pest	*Oil only*	*Nitro compounds only*	*Oil plus nitro compound*
San Jose scale	Effective	Questionable	Effective
Oystershell scale	Ineffective	Effective	Effective
Scurfy scale	Effective (?)	Questionable	Effective
Rosy aphid	Ineffective	Effective	Effective
European red mite	Effective	Ineffective	Effective
Fruit tree leafroller	Effective	Ineffective	Effective*
Apple red bug	Effective	Ineffective	Effective*
Bud moth	Ineffective	Effective	Effective‡

**Danger of tree injury at effective oil concentration.*
‡Danger of tree injury at effective nitro compound concentration.

TABLE 2—Control of the Fruit Tree Leafroller with Oil

*Oil concentration**	*Milligrams of oil deposited per square inch of bark*	*Per cent control*	*Tree injury*
1%	0.35	23	none
2%	0.83	74	none
3%	1.16	96	none
4%	1.74	99	none
5%	2.20	99	trace
6%	2.77	99	light
8%	4.00	99	moderate
12%	5.24	100	severe

**All lots emulsified with blood albumin 2 ounces per 100 gallons spray.*

TABLE 3—Effect of Emulsifier on Oil Deposit

Strength oil in spray	*Milligrams oil deposited per square inch of bark with emulsions prepared with*			
	Goulac	*Emulphor*	*Blood albumin*	*Skimmilk powder*
2%	....	....	0.83	2.79
3%	0.69	0.82	1.16	....
4%	1.10	1.22	1.74	4.07
5%	....	1.45	2.20	....
6%	1.90	2.02	2.77	4.72

TABLE 4—Influence of the Amount of Emulsifier Used on Oil Deposit*

Emulsifier	*Amount per 100 gallons*	*Milligrams oil deposited per square inch of bark*
Sodium lauryl sulphate	1 oz.	2.51
Sodium lauryl sulphate	2 ozs.	1.97
Sodium lauryl sulphate	4 ozs.	1.25
Blood albumin	1 oz.	2.62
Blood albumin	2 ozs.	2.43
Blood albumin	4 ozs.	1.50
Goulac (lignin pitch)	1 lb.	1.84
Goulac (lignin pitch)	3 lbs.	1.74

**Goulac emulsions at 5% oil strength, all others at 4%.*

between the amount of oil deposited on the tree and the control of the various pests for which the oil has a specific toxicity. This is what most of us would expect. But what determines how much oil is deposited on the tree? This is the crux of the situation. We have found that the most important factors are: (1) the concentration of oil in the spray mixture, (2) the kind and amount of emulsifier used and (3) the quantity of spray applied to the tree. A study of this kind would not be possible unless a method were available for accurately determining how much oil is actually deposited on the tree. G. W. Pearce and Dr. A. W. Avens, who are associated with me in studies of oil sprays, have developed such a method. Data are expressed in terms of milligrams oil deposited per square inch of bark.

We have found, as would be expected, that the quantity of oil deposited on the bark increases as we increase the quantity of oil in the spray mixture. Thus an oil emulsion containing three per cent oil would deposit more oil on the tree than one of a two per cent strength, and a four per cent more still. Some data in this connection are given in Table 2, showing also how oil deposit is correlated both with the control of the fruit tree leafroller and with tree injury.

However, where *different* emulsifiers are used in preparing a series of oil emulsions we may find little relationship between the concentration of oil in the spray mixture and the quantity of oil deposited on the tree. This fact is brought out in Table 3.

These data are important because it has been customary in recommending oil emulsions—all kinds of oil emulsions, whether they are commercially prepared or "tank-mixed"—at the same percentage strength for any given purpose. This may mean that because of differences in the amount of oil laid down on the tree, some oil sprays will give control, others will not, even though all may be used at the same strength. In other words, in the future we may have to know whether the oil emulsion intended for use is a light, intermediate or heavy depositor before we can use it intelligently. This question of deposit is largely controlled by the emulsifying agent — not only the kind but the amount used. Some figures on the influence of the amount of emulsifier used on deposit are given in Table 4.

All of the data thus far given have been based on home-mixed or tank-mixed emulsions. You may wonder if the conditions I have described apply to commercially prepared oil sprays. I give you some data on oil deposit and insecticidal efficiency of several proprietary oil sprays in Table 5. You will see that we find

(Continued on page 34)

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For berries, vineyards, small groves and orchards, or for a helper tractor in the large orchard, there is this John Deere 1-plow, gasoline-burning Model "L," shown here cultivating strawberries.

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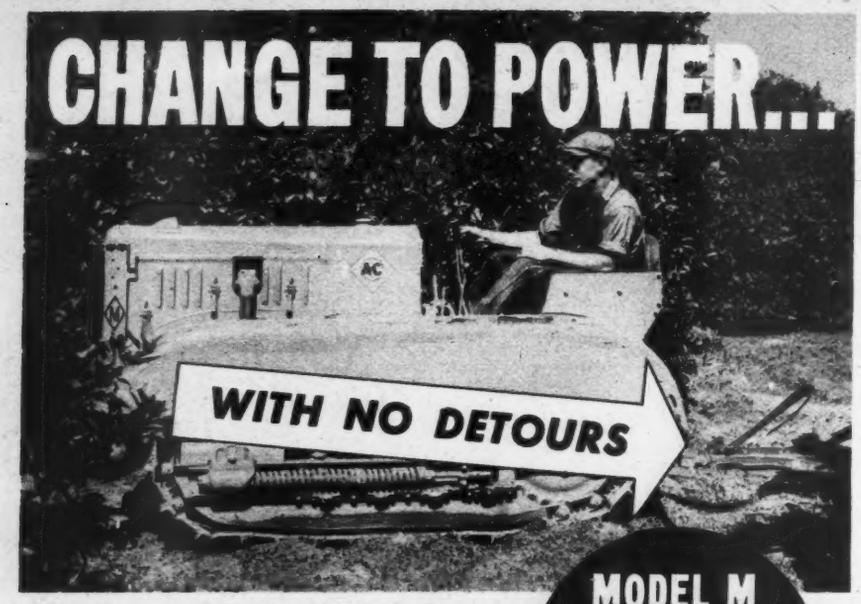

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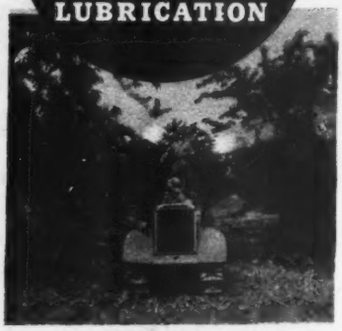

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APS

(Continued from page 20)

consumption of lead arsenate-sprayed apples. If, in the opinion of the Public Health Service, it is not sufficiently exhaustive, I am confident that the experiment will be continued.

The effect of the last raises upon residue removal has been to obviate washing in regions where the only insecticide problem necessitating summer spraying is the control of first-brood codling moth; that is, wherever not more than two early cover sprays are applied. In regions of intermediate difficulty, such as western Illinois, it has reduced the necessity for heating the acid bath. Prompt washing in an underbrush flood-type machine in one and one-fourth per cent hydrochloric acid (four and one-half gallons of 28 per cent muriatic acid made up to 100 gallons in water) has reduced typical second and partial third-brood lead arsenate-oil residues on fall varieties at Urbana, Ill., to .035 grain of lead per pound, when the temperature of the acid bath was 70 degrees F. and the duration of washing 30 seconds. The temperature of the bath could have fallen to 50 degrees F. without leaving more lead than the new tolerances permit.

In the Pacific Northwest, the danger of injury from heated washing solutions has been greatly reduced. It is now possible to wash much of the fruit in a single bath of hydrochloric acid. One important fact is that the new lead and arsenic tolerances are proportionally correct, since the usual proportion of lead to arsenic on washed fruit is approximately two to one.

Growers should be cautioned against relying on brushing for residue removal. Although brushing improves the appearance of the apples, it usually has little or no effect on residues. Because of the variation between samples, brushed apples sometimes carry more residue than unbrushed apples from the same lot. Growers should also be cautioned to comply with the present tolerances. It would be unfortunate to market apples exceeding the tolerances or carrying visible residues of any sort.

The necessity for analysis is not completely eliminated. It still applies wherever there is a possibility that residues may exceed the tolerance. Because of the new ratio of lead to arsenic, an analysis for one or the other should be sufficient.

NEW OFFICERS

The following officers were elected at the recent meeting at Hamilton, Ontario:

President—T. J. Talbert, Columbia, Mo.

Vice-presidents in charge of:

National Apple Istitute program—Truman Nold, Columbus, Ohio.

Public relationships—C. E. Chase, Wenatchee, Wash.

Pomological organization—B. S. Pickett, Ames, Iowa.

Spray residue research—W. A. Ruth, Urbana, Ill.

New horticuutural variety lists—F. P. Cullinan, Beltsville, Md.

Nomenclature—M. J. Dorsey, Urbana, Ill.

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NATIONAL DEFENSE

(Continued from page 16)

pruned tree can be more efficiently sprayed, thinned and harvested which will save labor expense. However, in view of recent experimental data, we find many orchards over-pruned and the yield of good fruit greatly reduced. This has been observed in West Virginia and Illinois by the author, and Prof. Fagan of Pennsylvania has pointed out many similar instances in his State. As every fruit grower knows, over-pruning is one of the most serious mistakes that is made on apple trees less than 15 to 18 years old.

3. Thoroughly spray at the correct time and with the right materials.

There is no need of elaborating on this point since every fruit grower has heard this recommendation so often he is beginning to suspect there is some truth in it. As an individual's defense program, this recommendation saves labor and materials, and insures a quality product. One thoroughly applied, well-timed spray with the correct material is worth more than a half dozen sprays improperly timed or poorly applied with ineffective ingredients.

4. Reduce cultivation to an absolute minimum wherever possible.

The Soil Conservation Service, the ACP and the Land Use Planning programs continually make us conscious of the very important programs they are sponsoring. In West Virginia our recommendation for apple orchards is to cultivate once in two or three years, this cultivation to be done with a single disking that leaves the surface rough and trashy so any soil washing is prevented and enough grasses left undisturbed to permit the re-establishment of the sod cover. Also, we like to have peach growers do only one or two cultivations per season. Not only do these suggestions save soil and organic matter, but they save dollars. Our cost account works show that sod orchards mowed twice each season have an expense charge of $2 per acre as compared to a cost of $8 per acre for a clean cultivation cover crop system of soil management. Moreover, if one desires to spend $8 to $10 per acre on orchard soils, his best investment will be in mulch materials that are hauled in to supplement the grasses and legumes which are produced between the tree rows. This is particularly advisable in mature apple trees and on the thinner soils as it will return the investment many times in increased yields, improved fruit size and better quality drop apples. Rodent and curculio control become more important factors in a mulched orchard, but certainly they are of secondary consideration in relation to good soil improvement. Poison bait for the mice can be effectively applied in

(Continued on page 40)

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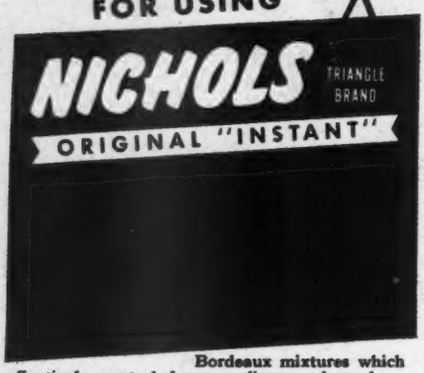

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NEW FACTS ABOUT OIL SPRAYS

(Continued from page 31)

great variations among these products. These differences can be attributed to the kind and amount of the emulsifying agent used, the method of preparing the product and the kind of oil employed. All in all, the evidence indicates a real need for standardization from the standpoint of field performance both among home and commercially prepared oil sprays, to the end that a grower can use these products with some assurance that if properly used they will give desired results.

We all appreciate that variations in insect and disease control in spraying may be accounted for by differences in thoroughness of spraying. No one expects—or at least should expect—to control the insects on limbs here and there over the tree which he fails to wet down with spray. Most discussions about thoroughness are really concerned with whether or not the sprayman covers all of the tree with spray. I shall not devote space to this phase of the question, important though it be, but to some effects of the quantity of spray applied where all trees have received at least the minimum amount of spray needed to cover all of the limbs on the tree.

It is impossible to spray a tree during the dormant period without wasting some spray. In windy weather a great deal of spray may be wasted if a sprayman is conscientious and covers the tree in spite of bad conditions. Further, varying amounts of spray strike different parts of the tree. In spraying from the ground, for example, the lower half of the tree normally receives more spray than the top half. It gets spray applied directly plus that falling earthward in the sprayer's attempts to hit the top of the tree. What I am leading up to is the question: Just how much oil may one deposit in spraying between what might be termed "normal" spraying and various degrees of over-spraying? I believe you will find some suggestions on this subject in the data given in Tables 6 and 7.

Briefly, these data show that the oil deposit laid down in normal spray coverage cannot be greatly increased with continued sprayings unless a drying period is allowed to intervene between applications. By applying twice the needed dosage in continuous spraying (Table 6), we see that the deposit was increased approximately one-third. Where the double

TABLE 5—Performance of Nine Commercially Prepared Oil Emulsions and Emulsible Oils—All Tested at a 4 Per Cent Oil Concentration.

Lot number	*Milligrams oil deposited per square inch of bark*	*Per cent control* Leafroller	Red bug
1a	1.23	20.8	50.3
2	1.27	26.5	....
3a	1.28	35.2	73.7
4	1.71	57.0	73.7
1b	1.82	44.1	72.1
5	1.85	100.0	93.3
3b	1.92	95.5	93.3
Tank-mixed*	2.03	99.9	97.9
6a	2.51	86.3	....
6b	3.38	100.0	93.3

**Emulsified with blood albumen 2 ounces per 100 gallons spray.*

TABLE 6—Effects of the Quantity of Spray Applied on Deposit and Control of the Fruit Tree Leafroller.

Treatment	*Total gallons spray applied*	*Milligrams oil deposited per square inch of bark*	*Per cent deposit increase*
Oil Emulsion A	15	1.10	....
Oil Emulsion A	30	1.47	33.6
Oil Emulsion B	15	1.22	....
Oil Emulsion B	30	1.60	31.1
Oil Emulsion C	15	1.85	....
Oil Emulsion C	30	2.53	36.8

TABLE 7—Effects of Double Spraying With Oil Emulsions

Treatment	*Total gallons spray applied*	*Milligrams oil deposited per square inch of bark*	*Per cent increase in deposit*
Oil Emulsion A	20	1.31	....
Oil Emulsion A	40*	2.51	91.6
Oil Emulsion B	20	1.47	....
Oil Emulsion B	40*	2.88	95.9
Oil Emulsion C	20	1.39	....
Oil Emulsion C	40*	2.66	91.4

**Sprayed twice. First application allowed to dry four hours before respraying.*

dosage was applied in two sprayings with a drying period in between (Table 7), the oil deposit was nearly doubled.

It may not be clear to you, immediately, just what practical application there may be to these data, especially that given in Table 7. You may say, for example, that fruit trees are almost never intentionally sprayed twice with oil during the same dormant period. True. But if you follow the practice of spraying with the wind—that is, covering the windward side of the tree row one day, treating the other side a day or so later when the wind shifts—then at least part of the tree may be sprayed twice. There are many practical advantages to spraying with the wind, but in following this practice you can build up local excesses of oil deposit on the tree. When a spray of low oil content is used, this may not cause undesirable results. If, however, the deposit laid down by a single spraying is about all a tree will tolerate, then injury may occur from doubling up the deposit.

"THEY GOT ME!"

(Continued from page 22)

Woolly aphids were almost entirely absent. Mites made no headway till late in the summer, too late to do appreciable damage. This is important, since competent authorities are saying that the Pacific mite (*tetranychus pacificus*) is in its unobtrusive way doing as much damage as the codling worm. Whether or not rotenone ultimately proves of value in the fight against worms, its proved usefulness against sucking insects entitles it to a place in the arsenal of weapons of the fruit grower.

The lesson that may be drawn from this attempt to use rotenone against the codling worm is that the fruit grower cannot afford to experiment. He must not wildcat. He must be a pothunter. He must always try to bet on a sure thing. He must leave experimenting to the professional experimenter who can afford to fail. And yet, someone must wildcat. Many valuable discoveries have been made by accident. It was my hope that I had made one.

So the report is one of failure. And yet, so long as it is my lot to be a fruit grower, that miraculous crop of 1939 will not be forgotten. I will never cease to wonder if, could the right combination or method or an elusive something be found, that crop might not be duplicated. When a thing has been done once, why cannot it be done again? Perhaps not. To parody Sir Arthur Sullivan's song, "The Lost Chord," "It may be only in Heaven will I see such a sight again"—if by any chance an apple grower ever gets to Heaven.

AN OWNER SINCE '31 REPORTS!

The Lyman Farm
Middlefield, Conn.

October 25, 1940

Caterpillar Tractor Co.
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Gentlemen:

We operate a large fruit and dairy farm at Middlefield, Connecticut, which comprises approximately 400 acres of fruit trees and 300 acres of tillage land. We purchased our first "Caterpillar" track-type Tractor, a Fifteen, in April 1931, have used it every year since at a minimum upkeep expense, and it is still rendering excellent service.

During April 1936, we purchased a "Caterpillar" Twenty-Two Tractor to use along with the Fifteen. After 5 seasons, we have only turned the Twenty-Two's track pins and bushings and have just relined the brakes — our only repair expense save for grinding the valves each year.

In October 1939, we purchased a Diesel D2 Tractor. This tractor operated through the 1940 growing season pulling a 600-gallon power take-off driven sprayer with 35-gallon-per-minute pump. The Diesel D2 has operated on from 9 to 10 gallons of fuel during a 9-hour day. Our operators state the Diesel D2 will take the sprayer with ease over our hills and through mud holes.

Starting September 1, 1940, our Diesel D2 has been operating a 10-ton compressor in our apple storage plant by belt pulley drive. The D2 consumes only 32 gallons of fuel each 24-hour period, and we stop the engine only once a week to change oil and service the entire unit.

We are much satisfied with our "Caterpillar" track-type Tractors, and when we must replace our present machines or purchase additional ones, "Caterpillar" will receive first consideration.

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ORIENTAL FRUIT MOTH

(Continued from page 15)

go over the orchard any more that season. At harvest time (August 25) the infestation in this orchard had built up until it averaged 13 per cent of the crop.

Taking the 1935 infestation as a base from which to figure, and with the infestation of that year at 25 per cent, let us compute the cost of clipping. That year the infested fruit amounted to a fourth of the crop. This resulted in a lowering of the price of a fourth of the fruit. The average price paid that year for peaches free of worms was $1.25 a bushel, but as the result of the heavy infestation one bushel out of every four had to be sold for 50 cents. This amounted to an average per bushel reduction of 18.75 cents. Thus the peaches sold at an average of $1.06 per bushel. In 1937, on the same basis and by clipping off the infested twigs, there were only 2.6 per cent visible entries at harvest. This reduced the price two cents per bushel. The fruit then sold at an average of $1.23 a bushel, which was 16.75 cents a bushel more than in 1935. It cost five cents a bushel to clip the twigs so that 10.75 cents per bushel was earned by clipping off the infested twigs. This is a nice earning for this operation.

In 1938 fruit commanded a little better price in Indiana, and it was therefore more to the grower's advantage to keep the crop free from worms. Infested twigs were removed 14 times during the season, the average selling price per bushel was $1.36, the fruit was only 1.5 per cent infested (visible), and it cost 15.4 cents a bushel to clip the twigs. Inasmuch as the infestation was so low no deductions were made for wormy fruit, but the cost of the clipping operation was subtracted from the selling price, leaving $1.20 per bushel for the fruit.

These figures represent actual field conditions. In addition, since 1936 more intensive plot studies have been in progress to determine the possibilities of attaining commercial control of the Oriental fruit moth on varieties which ripen later than Elberta and J. H. Hale. Through this work on Williams Favorite and Fleener the following points have been noted as important in the consideration of such a program if success is to be attained.

1. The orchard should be isolated from other peach and apple plantings.

2. When attempting control by the removal and destruction of infested twigs and peaches, every care must be exercised to see that no trees are left untreated.

3. The later the peach variety under consideration, the greater the cost of keeping the crop clean and the greater number of times the orchard will have to be clipped.

4. Seasonal conditions often cause

very considerable differences in the population of the Oriental fruit moth.

5. Twig clipping should be started early in the spring, the entire orchard worked over at least every five days, preferably oftener, and this work should be continued until less than a month before harvest.

6. Usually more attention should be given to border rows of trees than those in the middle of the planting.

7. Every care should be given to remove each time all infested twigs and fruits. All dead and dying leaves should be removed from the trees each time the trees are visited, thus simplifying later examinations.

8. Tree height should be controlled so that all infested twigs can be reached from the ground with the aid of a short hook.

9. Control by this method reduces to a minimum brown rot and the necessity of sprays to control this disease. No separate thinning operation is necessary when the mechanical control practices are adopted.

10. Debris should be kept cleaned up from around the trees, packing houses and roadside stands should be kept screened till after spring emergence is over, and boxes and other containers should be kept inside screened buildings to prevent escape of moths emerging from these containers.

11. Not all reliable orchard help can be depended upon to do a satisfactory job of twig clipping. Many people who are very efficient in other orchard work do not have the ability to see newly infested twigs readily.

12. As the result of the larval habit of going from one twig to the other, at least twice as many twigs will be removed as larvae.

13. Any natural or induced conditions, which occur between the period of fruit set and the time the peaches begin to soften before ripening, and which result in the hardening up of the twigs, will materially reduce the population of the Oriental fruit moth.

14. The Purdue station studies, so far conducted, indicate that where conditions make possible the adoption of this method of control, and if it is exercised efficiently, clipping of infested twigs will yield a reasonable return on the money and time invested.

For the tenth consecutive year members of the cherry canning industry will promote National Cherry Week from February 15 to 22. As in the past, grocers, restaurants, hotels, food manufacturers, bakers and can manufacturers will co-operate in the event. Featured during the week will be state and county pie baking contests in the various cherry producing states, the winners of which will take part in a national cherry pie baking contest in Chicago on February 22. A cash prize of $100 will be awarded the winner of the final pie baking contest.

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THE CHESTNUT IN SOUTHERN FRANCE

A VERY interesting account of chestnut culture in southern France was prepared for the Roanoke meeting of the Northern Nut Growers' Association by Dr. V. A. Pertzoff of Hubbardstown, Mass., who owns a farm 100 miles northwest of Marseille on the southern edge of the chestnut country.

After the chestnuts are gathered they are dried in small two-story buildings. A slow fire of chestnut logs is made on the ground floor; on the second floor the chestnuts are spread about a foot deep. The heat and smoke rise through the cracks of the floor, then through the chestnuts, and pass out through the tiled roof. The house has no chimney.

The dried chestnuts are then shelled in a machine that travels from farm to farm doing custom shelling. In the machine the chestnuts are given a brisk rub to remove the dry shells and skins, which are blown out by a fan, leaving the neat, wrinkled, white kernels. The kernels are stored in a dry place for later use.

The nuts are used daily as food by the farmers and their families. Chestnuts are a major item of hog feed, the chestnut-fed hogs producing hams of high quality which bring a high price. The hens and dogs also like chestnuts, the latter eating them cooked.

The chestnuts are grown on the rocky slopes of the Pyrenees and Cevennes where no other crops will grow. The history of the chestnut in this region is obscure but they are thought to have been introduced by the Jesuits in the 15th century at which time terraces may have been made to hold the soil and the moisture.

Two classes of chestnuts are grown, the common and the cultivated. The common chestnut grows on the mountains and receives no care and the trees and nuts are small, the latter not being sold. The cultivated chestnuts are known as marrons and are grafted trees. The marrons are larger than the common chestnuts with a shell of clear, bright chestnut color with darker stripes. The marron tree is less productive and less hardy than the chestnut tree and requires more attention and water.

The chestnut tree in France is relatively free from diseases and insect pests.—G. L. SLATE, Sec'y, Northern Nut Growers' Assn., Geneva, N. Y.

CONTROL OF CLIMBING INSECTS

IN addition to thorough, periodic spraying as an all-round preventive of insect infestation, the practice of banding fruit trees and grape vines has proved effective in controlling several species of climbing insects.

Foremost among the insects that can be controlled by the banding method are spring and fall canker worms, tussock moth caterpillars, gypsy moth caterpillars and climbing cutworms. There are the leaf-eating type of insect pests and have no means of reaching branches other than climbing the trunks of trees and vines where mating occurs and eggs are deposited from which tht moth caterpillars or worms hatch and start feeding on the foliage.

The climbing cutworm eggs are laid in sod land in late summer, from which the worms emerge the next spring and at once commence eating out the opening buds and young foliage.

There have been many instances of widespread damage caused by cutworms. Growers have found from experience that circling their trees and vines with thin bands of Tree Tanglefoot is a most effective control measure.

The banding method has also proved effective in controlling the Fuller Rose weevil, the small gray beetle attacking buds and foliage of citrus trees.

STATE NEWS

(Continued from page 19)

Sulphur sprays and the control of scab and codling moth were among the subjects discussed at the meeting by Charles H. Blasberg, Vermont research specialist in orchard management and extension horticulturist.

Stating that the codling moth has been on the increase in Vermont orchards for the last three years and that it has caused serious damage in a number of Champlain Valley orchards, Mr. Blasberg explained that his observations have led him to believe that there is no second brood in the State. "We have studied this pest for the last two years and find that emergence continues until around the middle of July," he said.

Mulching, if it can be economically accomplished, was suggested by Dr. J. K. Shaw, professor of research in pomology, Massachusetts State College, as about the most promising way to fertilize orchards. In expressing his belief in mulching, Dr. Shaw stressed, however, that it is not the only way to fertilize orchards.

FRUIT AND DEFENSE

A unique goodwill merchandising idea, combined with a patriotic gesture, is being carried out at the Pennsylvania Railroad Station fruit stand of Herbert Strausser, Inc., in New York City, it is reported by the Florida Citrus Commission. Draftees, passing through the station en route to the various training camps throughout the country, are given two tangerines each with the compliments of the Strausser stores.

Because the Pennsylvania Railroad serves Camp Upton on Long Island, Fort Dix in New Jersey, and connects with other lines running to training camps throughout the country, including Fort McClelland at Anniston, Ala., hundreds of Uncle Sam's new soldiers benefit from the gesture.

While no immediate cash benefit accrues, the operators feel the move a valuable goodwill activity.

IOWA—In spite of the damage to nursery stock caused by the freeze in early November, nurserymen in attendance at the 20th annual convention of the Iowa Nurserymen's Association at Des Moines, January 2-3, reported they are in a position to secure sufficient nursery stock for 1941 planting. The discussions at the meeting, attended by 63 nurserymen, brought out the fact that hardy stocks such as Hibernal suffered little or no damage during the freeze.

Leading orchardists in Iowa believe where hardy stock is planted it should be topworked by budding or grafting well out on the scaffold limbs and high on the leader.

While it is impossible at this time to determine the exact amount of damage done to orchards in Iowa by the November freeze, it is believed fruit buds on our leading varieties such as Jonathan, Delicious, Golden Delicious and Grimes are severely injured. A lot of injury to the trunks of these varieties also seems to have occurred. Even where varieties were stem grafted on Virginia Crab, the understock shows a decided browning of the cambium layer.—R. S. Herrick, Sec'y, Des Moines.

UTAH—Marketing and canning of fruits and the needs of the Utah fruit industry were the subjects discussed at the annual convention of the Utah State Horticultural Society.

In view of the fact that many of the problems confronting the fruit industry in Utah could be solved by appropriate research conducted by the Utah State Agricultural College, President J. A. Howell told growers that he was requesting additional funds from the State Legislature in order that such research might be completed.

The problem of selling fruit on retail markets was discussed by D. L. Dudrow, produce

(Continued on page 43)

Now Shown at CASE Dealers

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Here is the tractor fruit men have been asking for—low-priced and compact, yet with more capacity and more convenience than ordinary small tractors. This new Case "VO" has hundreds of pounds more weight built in to provide better traction, so you can pull implements at normal depth in tougher conditions. It has more engine, to keep going at normal speed more steadily.

The "VO" gives you four gears forward — three practical field speeds to provide the proper pace and pull for every implement and every condition, plus a fast fourth gear for hauling and for quick moves between jobs. Its power take-off is properly placed for driving spray rigs. It has the famous Case full-swinging, self-locking drawbar that makes short turns easy with full load, yet automatically becomes rigid when backing. It gives you the convenience of electric starting and lights (optional) with the extra dependability and efficiency of magneto ignition.

Why let operator and implements work at less than their full capacity when it costs so little to have a "VO"? Take a look at this more modern, more capable orchard power now at your Case dealer's. For still faster work Case has two larger sizes of grove tractors. Send in the coupon.

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Know what's newest in power and implements for fruit culture. For latest bulletins or folders mark items that interest you; mail to J. I. Case Co., Dept. B-12, Racine, Wis., or nearest branch.

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Grove & Orchard Tractors
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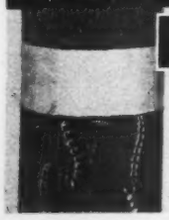
*Address*_____

_____ *Acreage*_____

I'VE USED TREE TANGLEFOOT OVER 30 YEARS



STOPS CLIMBING INSECTS

I know from experience that TREE TANGLEFOOT bands, properly applied, are 100% effective in controlling destructive cutworms, canker worms, tussock-moth caterpillars, and all other climbing insects. I band regularly, and figure it's the most economical profit insurance I can buy.

EFFECTIVE FOR MONTHS

I don't think it's good business to experiment with substitutes. I know what TREE TANGLEFOOT will do. I know that it keeps that soft, sticky elasticity for months, regardless of weather. It's 100% dependable.

ALWAYS SAFE

I have used TREE TANGLEFOOT on young trees and vines for years, and while I'm no expert on chemistry, I do know that this old, reliable banding compound has never harmed any of my trees or vines, consequently I figure that the claim that TREE TANGLEFOOT contains no harmful chemicals of any kind, is absolutely true.

ENDORSED BY EXPERTS

I've seen and heard the recommendations of forestry experts, government experiment stations, and large commercial orchardists. So, I say if you want the most effective and economical means for controlling destructive climbing insects, get TREE TANGLEFOOT.

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FAMOUS FOR OVER 100 YEARS

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New Patented Spray Gun
Greater distance - Better fog
Write to
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Hood River, Oregon

WATCH THIS NAME WINDMASTER

NATIONAL DEFENSE PROGRAM FOR GROWERS

(Continued from page 33)

mulched areas, and a lead arsenate spray for curculio is a better control measure than cultivation. Finally, where legume sods or mulches have been used and the "on" year in apple production anticipated in your orchard, the normal application of nitrogen-carrying fertilizers can be greatly reduced or eliminated. At least the application can be put off until two or three weeks following bloom when it can be more intelligently applied according to the tree condition and crop needs.

5. Remove all imperfect fruits in late May or early June.

Growers thin fruits to avoid overloaded trees and to assure increased size of the fruits which remain for harvest. Probably the prime reason for fruit thinning should be the elimination of a considerable amount of the cull fruits at an early stage in their development. This procedure constitutes a fruit grading operation that can be done more quickly and with less confusion than in the packing shed at the normal harvest season. This is a very important item in the efficient use of a limited labor supply. In addition it can be assumed that cull fruit harvested in late spring will not find its way to the fresh fruit market as it does when harvested in September or October. Certainly we all approve of keeping culls out of our fresh fruit markets but too many of us believe it to be a better program for our neighbors than for us to follow.

6. Harvest and pack without bruising the fruit.

Why do so many fruit growers invest hundreds or thousands of dollars in a fruit crop up to harvest and then seemingly lose all their sense of proportion in allowing the fruit to be tossed around by the pickers, packers, and loading crew?

It should be a simple matter to use enough caution and care to have the fruit removed from the tree and delivered to the consumer in a first-class unbruised condition. Probably the largest economic waste in many orchards is bruising good fruit to a point where its value is lowered from 75 cents to 15 cents a bushel.

The principal places to pay particular attention to bruising are: with the picking crew, hauling to packing house, over the sizing machine, into the package, storage handling and subsequent delivery to retail stores and consumers. West Virginia's survey indicates 10 to 50 per cent of the fruit was bruised in picking, two to 10 per cent in hauling, and as much as 79 per cent of the fruit was bruised in the packing shed, of which 58 per cent took place in a washing unit. And finally, 14 to 57 per cent of bruising can occur when the fruit is packaged. This is done by careless running of the fruit into the package from the take-off bins, or by over-filling the package. In some tests run with Grimes, Stayman and Golden Delicious, it was found that when a net weight of over 46½ pounds of fruit was put in a standard tub bushel, a greatly increased amount of bruising follows. Yet this amount of fruit gives a tight pack and passes inspection.

In rail shipments and storage much bruising of fruit occurs. Here cars and trucks should be carefully loaded, undue squeezing of packages avoided, and a sufficient bracing given the load. In storages, bushel baskets can be stacked too high and storage employees do too much climbing and walking around over the tops of the packed fruit. Insist on better care in handling your fruit in rented storage space.

7. Expansion of invested capital might be more wisely done through the purchase of labor-saving machinery and storage facilities rather than for an expansion in land and in trees.

As the trend now indicates, labor will become increasingly scarce and the cost higher. The quality may also decline, as might be expected. Therefore, machinery that saves or replaces man power is the popular and modern thing to do and fits in with the "American Way of Life" that encourages shorter hours and higher wages to employees. Also, most of us can remember the plight of the farmers brought about 23 years ago by agricultural prices which caused them in moments of undue optimism to purchase high-priced land. Then with the advent of low prices for their product, too many farmers found they had lost their shirts. Therefore, it is my opinion, that in the long run of events, sound and conservative capital investment for storages, stationary spray plants, modern sizing machinery, and perhaps for cider-making equipment is more desirable than expansion by increasing the bearing acreage of fruit trees. Of course, maintenance of your present production capacity may be warranted; this is something everybody must decide for himself. New plantings of trees might well be made by many growers in anticipation of the time when some of their present high-producing trees will have to be removed because of their age.

8. New hormone sprays used to extend harvest period.

The use of naphthalene acetic acid as dilute spray to prevent excessive apple dropping during harvest can have considerable value in extending the amount of time available for harvesting where growers have a limited labor supply. By spraying part of a Jonathan or Delicious block, harvesting can begin on the unsprayed portion of the block and continue on through by finishing on the sprayed part. This suggestion is more applicable to summer and fall varieties but may have some advantage on later varieties in the South where late fall freezes are not the hazard they are farther north. Late fall freezes should not be much of a hazard from central Pennsylvania on south.

9. The farm storage of fruit.

In the East Pennsylvania has pioneered in fruit storage research and extension. During the last 20 years, many storages have been constructed by fruit growers on their farms. The work of Professors Anthony, Fagan, Magnus and Hechler with the farm storage problem has given large economic returns in the past and presents even a brighter future. Advantages of the fruit farm storage are: (1) Its convenience aids in shortening the time between picking and getting the fruit into storage which prolongs the keeping qualities. (2) Fruit direct from the orchard can be stored in field crates and packed later. This means smaller and more select packing crews. (3) It permits the packing out of fruit late in the storage season according to specifications received from buyers. This assures packed fruit of better grade and quality. (4) A storage saves enough money to pay for itself over a five-year period in some communities. A few West Virginia growers find their total operation expense with a large storage is between four and five cents per bushel. Rented storage had cost them 15 cents per bushel. A difference of 10 cents that pays the cost of the storage in a relatively few years. Also such storages will find increased use in the hands of some growers. They can be used to precool summer apples, peaches, and strawberries prior to shipment by rail or truck. They may be of value for storage of orchard crates at the time of codling moth emergence. Such tight enclosures would be prisons for these moths until they died of starvation. Possibly in some communities, supplementary space for locker storage might be made available which could be rented to neighboring farmers for their personal use.

Each of these foregoing points suggests something that is positive and

(Continued on page 42)

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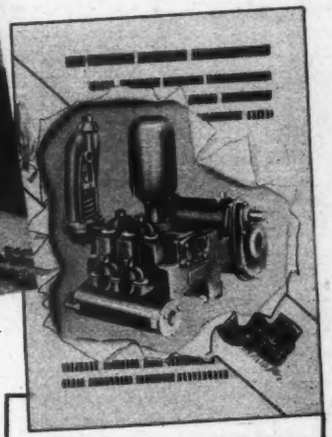

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NATIONAL DEFENSE

(Continued from page 41)

tangible in an action program that deserves the careful consideration of every fruit grower. The adoption of this program by individuals would go far in the solution of many of our present headaches: "Culls"—high labor costs—market demand—etc.

Group or Organization Program

The individual can go just so far in his contribution to a national defense program, then it becomes necessary to have group action to complete the job. At least a half dozen suggestions seem timely as to what our grower organizations can do.

1. Strive for a more direct marketing program.

Our Federal government recognizes this need and will present before Congress a marketing bill in the near future which will be more comprehensive and tend to replace some of the five or six heterogeneous marketing acts now in effect. This bill will offer more help in marketing research and extension. It will also provide greater aid for state regulatory work. This phase of a program will increase efficiency, reduce waste and will conserve labor, finances and materials, which is necessary in any defense plan.

2. Promotion of fruit sales must be considered by fruit growers organizations.

This means apple growers must do at least a minimum amount of advertising, grocery store service work, and continue to support the research for additional health factors their products contain. Also dealers and jobbers who handle our products are just as vitally interested in this program and should be included in any grower group effort.

3. Co-operative purchase of supplies.

In the face of rising costs it should not require much emphasis or elaboration on this point. Certainly, savings made on group purchasing will have considerable use toward meeting other financial obligations. One of our fruit growers recently stated: "I might find it necessary to borrow some money next March in order to pay my income tax." Anyway, most of us have many places to use a little extra money which may be saved on the purchase of some essential.

4. Governmental regulations affecting fruit growers.

Our public servants have good reason to place more emphasis on group demands than in those of individuals. Many of them sincerely desire the advice of the people they represent, but they want their suggestions to be

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Two weeks earlier than Thorny variety and much easier to pick. Extremely hardy. Immense cropper. Big money maker.
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crystallized and to really represent the opinion of the majority. Hence, when an organization asks for reconsideration of the lead tolerance on fruit or a part in the ACP program that more nearly meets the grower's needs, they usually get satisfactory results. In a world that is undergoing social and economic change these organizations are greatly needed to guide their public servants, protect their own business and give effective aid to a program that benefits every United States citizen.

5. Educational programs in production and marketing.

State horticultural societies for many years have completely justified their existence by sponsoring educational programs. Today such group activity is more necessary than at any previous time. Horticultural societies through their meetings, news letters and special bulletins are avenues for the quick distribution of important information that may be vital in a national defense program. Regardless of what situation may arise, the completely informed group or individual has a very definite advantage in defense or attack with considerable assurance that victory will be on his side.

6. Social gains in group effort.

This final point does not limit its scope by referring to the pleasures and good times individuals have at a horticultural society convention. It means more when one considers the present broad definition of social gains. Some of the leading world authorities believe the social revolution now taking place in every country is more important than the economic upheaval. Briefly, social gains may include such factors as health, sanitation, education, recreation, safety measures, vocational guidance, and anything that benefits a society which includes every man, woman and child.

In conclusion, it is in order to quote a statement made by Chester Davis who represents the nation's agricultural industry on the National Defense Advisory Commission: "But above all considerations, is the immediate objective of organizing our abundant resources to keep war from these shores. I repeat, American agriculture is already producing in abundance what the nation requires from it. But beyond that, if sacrifices are called for, I am confident that American farmers are ready to make their contribution for the maintenance of liberty and the ideals of free men."

STATE NEWS

(Continued from page 39)

manager of Safeway Stores Incorporated, Salt Lake City.

The Utah fruit shipping deal as it applies especially to peaches and sweet cherries was summarized by E. O. Muir.

Judge Howell was re-elected president of the society and John Burningham, vice-president.—A STARK, Sec'y, Logan.

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Levers adjustable. Can be let down, so as not to strike limbs and fruit.

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700 ACRE ORCHARD AND STOCK FARM. SIXTY acres 20-year old apple, twenty acres 6-year old apple and nine acres 2-year old peach, balance blue grass pasture, well watered, six good springs. Two good dwellings, 50x76 packing shed, 56x60 cattle barn, 30x60 horse and cattle barn, cribs, granaries, hog houses, stock scales, etc., natural gas well, electricity, good feed lots and fences. Located in Pike County, Illinois, on good gravel road, two miles from U.S. Highway 54. I have raised and sold more than $200,000 worth of apples and livestock on this farm in the past fifteen years. Price $30,000. L. L. ANDERSON, Summer Hill, Illinois.

430 ACRE ORCHARD ON LOOKOUT MOUNTAIN eighty miles north of Birmingham, Ala. 15,000 peach and 3200 apple trees, $50,000. 213 acres near Summerville, Georgia, 10,600 peach trees, 2300 apple, $40,000. 430 acres near Adairsville, Georgia, 15,500 peach trees, $25,000. Each unit fully equipped and good manager. Will sell separately or as a whole. Orchards in first class condition. They produce mountain fruits that are famous for color and flavor. For further details write JOHN F. FUGAZZI, P.O. Box 175, Clearwater, Florida.

CONNECTICUT, 55 MILES NEW YORK, 42 ACRES half planted with orchard, run by fruit specialist. 1000 peach trees, 550 apple trees, 12-15 years. Finest commercial varieties. Latest equipment. New buildings. $13,500 if taken soon. DR. HARWIG, RFD 1, Danbury, Connecticut.

2270 ACRES NEAR ALBANY, GEORGIA. 35,000 peach trees, mostly bearing, 2000 pecans, $80,000. Willing to sell half interest. For details write J. F. FUGAZZI, Clearwater, Florida.

SPRAYER, 4 H.P. BEAN ENGINE, BEAN TRIPLEX pump, 250-gallon tank. Good condition. $125.00. EVERETT SMITH, Shubert, Nebraska.

32-ACRE COMMERCIAL ORCHARD. BURT HUSTON, Wilder, Idaho, Owner.

MALE HELP WANTED

STEADY WORK—GOOD PAY. RELIABLE MAN wanted to call on farmers. No experience or capital required. Pleasant work. Home every night. Big money every day. Wonderful new proposition. Particulars free. Write McNESS CO., Dept. 465, Freeport, Illinois.

MISCELLANEOUS

EVENTUALLY YOU'LL LIVE IN FLORIDA. KEEP in touch with its agricultural opportunities by subscribing to its leading citrus and truck magazine. 50c per year; 3 years, $1.00. FLORIDA FARM AND GROVE, Jacksonville, Florida.

NURSERY STOCK

STRAWBERRY PLANTS $2.25-1000 UP. THORNLESS Boysenberries. 10 Giant Blueberries $2.00. Tree Strawberries. White Blackberries. Black, Yellow and Red Raspberries. Blackberries. Fruit Trees. Grape Plants. Peach and Apple Trees 10c up. 100 Asparagus 50c. Shade Trees 12c up. Hardy Shrubs. 100 Hedge Plants $1.75. Everblooming Roses. Evergreens 5c up. Perennials. Giant Glads. Mammoth Dahlias 15c up. Garden Seed Bargains. Big Discounts for Early Orders. CATALOG FREE. ZILKE NURSERY. Baroda, Michigan.

EAT STRAWBERRY SHORTCAKE JUNE TO DECEMber first year you set our healthy everbearing plants. Only 2c each postpaid. 100 sufficient family use. Easy to grow. Big profits. $500.00 acre possible. Instructions furnished. 8000 sets acre. $75.00 PREPAID. Also bearing age fruit trees, berry bushes, grapes, thornless Boysenberries and cultivated blueberries larger than 5c coin. Complete natural color catalog FREE. SOUTH MICHIGAN NURSERY (Dept. 22), New Buffalo, Michigan.

FRUIT TREES, BERRY PLANTS, ORNAMENTALS. Complete line of fruit and nut trees; blueberry, Boysenberry, strawberry, raspberry, grape, asparagus plants; flowering shrubs, shade trees, and evergreens. One of America's leading nurseries selling direct with 75 years' production experience guarantees satisfaction. Send for free catalog. BOUNTIFUL RIDGE NURSERIES, Box F241, Princess Anne, Maryland.

MAKE YOURS A HOME TO BE PROUD OF! SEND today for Inter-State's NEW beautiful, useful, money-saving nursery and seed catalog. It's Free. New Perennials, roses, shrubs, trees, vines, fruits, seeds, bulbs, etc. Natural colors. First quality guaranteed stock. America's Largest Direct-To-You Nurseries. INTER-STATE NURSERIES, 29 E. Street, Hamburg, Iowa.

FRUIT TREES GROWN BY VIRGINIA'S LARGEST growers, offered at lowest prices in thirty years. The new improved varieties of apple and peach at common variety prices. Write for New Low Price List, offering a complete line of fruits and ornamentals. WAYNESBORO NURSERIES, INC., Waynesboro, Virginia.

HARDY NORTHERN ROOTED FRUIT TREES CAN "take it." Recent heavy losses from November blizzard demonstrate the wisdom of planting hardy orchard trees. Send for our free book of hardy trees including Hibernal and Virginia for topworking. ANDREWS NURSERY Faribault, Minnesota.

ASK FOR BENTS 1941 CATALOG DESCRIBING NEW, dependable fruits, trees, evergreens, shrubs, flowers best suited to our locality. Stock dug fresh, sold direct W. A. BENTS NURSERIES, Cresco, Iowa.

CRATH CARPATHIAN HARDY ENGLISH WALNUTS, Seed. Crath Importation. 3-year trees, 3-4 feet. $2.50-9—$7.00. 2-3 feet, $2.00 each. W. HALBERT, Oxford, New York.

BLIGHT RESISTING CHESTNUT TREES, APPLE seedlings and root grafts. VIRGINIA TREE FARMS, Woodlawn, Virginia.

THIN-SHELL BLACK WALNUTS—RAPID GROWERS, beautiful shades; bear 2nd year. Nuts large, easily cracked. Catalog free. CORSICANA NURSERY, Corsicana, Texas.

25,000 NEW, HARDY VARIETIES PEACH AND APPLE trees. Catalog free. MARKHAM, Fruit Breeder, Xenia, Illinois.

ORCHARD SUPPLIES

WE CAN FURNISH EVERYTHING NEEDED IN growing, harvesting and packing your fruit. We handle only high quality reliable merchandise. Send us your inquiry and make us prove it. TYSON ORCHARD SERVICE, Edwin C. Tyson, Flora Dale, Pennsylvania.

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PICKING BAGS

FOR HANDLING THE MOST TENDER FRUIT SAFEly, economically and quickly, write us for information regarding our Peach and Apple Picking Bags. TOWNSEND COMPANY, Lake Wales, Florida.

POULTRY

NEW ENGLAND POULTRYMAN AND NORTHEASTern Breeder. Special offer—six extra months free with your new or renewal subscription at regular rates. 1 year for $1.00, 3 years for $2.00, 5 years for $3.00. Interesting news and views. Valuable editorial material on skillful breeding, profitable production, and efficient marketing. Carefully censored advertising. Nationally read by poultry leaders. Subscribe now! NEW ENGLAND POULTRYMAN, 4F Park Street, Boston, Massachusetts.

AMERICAN POULTRY JOURNAL, 560 SOUTH CLARK Chicago, features colored pictures of poultry and common poultry diseases supplementing valuable information enabling you to increase profit. Six months 10c, two years 25c.

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BEAUTIFUL SILK HOSIERY. 5 PAIRS $1.00 (TRIAL 25c). Three exquisite fulfashioned $1.25. DIREX, AF346W Broad, Savannah, Georgia.

STRAWBERRY PLANTS

STARTLING NEW STRAWBERRY—MAJESTIC, PATented October 24, 1939. Has been thoroughly tested four years by experiment stations, nurseries and numerous growers in eight states. Tests proved extraordinary yield, size, flavor and shipping quality. Free from leaf spot and other diseases. Plants inspected. Plants priced on request. E. L. RUSSELL, Jonesville, Virginia.

BLAKEMORE, DUNLAP, KLONDYKE, AROMA, DORsett Strawberries: 500, $1.25; 1,000, $2.25; Fairfax, Premier, Catskill: 500, $1.50; 1,000, $2.50. Gem Everbearing: 100, 90c; 500, $2.75. SHELBY PLANT FARMS, Memphis, Tennessee.

SPECIAL! 200 YELLOW FREE BLAKEMORE OR Dunlap plants delivered $1.00. Free beautiful colored Calendar Catalog quoting sensational low prices on strawberries and vineberries. WALLER BROS., Judsonia, Arkansas.

NEW TWENTIETH CENTURY EVERBEARING Strawberry. Large, well colored, firm, excellent carrying qualities. Write for prices from originator. T. KASUGA, Union, Utah.

YELLOW RESISTANT BLAKEMORE STRAWBERRY plants: 1,000, $1.75; 100,000 lots $1.60 per thousand. C. H. ROCHELLE, Kenton, Tennessee.

MILLIONS CERTIFIED YELLOW FREE BLAKEmore strawberry plants. Write for prices. R. R. McUMBER, Greenfield, Tennessee.

VEGETABLE PLANTS

CERTIFIED, FROST-PROOF CABBAGE AND ONION plants. Cabbage, All Varieties. Parcel Post Prepaid. 200, 65c; 500, $1.00; 1,000, $1.75; Express collect, 2,500, $2.00. Onion, All Varieties Parcel Post Prepaid, 500 60c; 1,000, $1.00; Express collect, 6,000, $2.00. Prompt shipment, safe arrival, satisfaction guaranteed. Catalog free. UNION PLANT COMPANY, Texarkana, Arkansas.

VEGETABLE PLANTS: FIELD GROWN IN NATURE'S greenhouse. Make earlier, larger yields, Cabbage, Onions, Tomatoes, Peppers, Potatoes. Catalog free. OMEGA PLANT FARMS, Omega, Georgia.

WANTED

WANTED TO BUY—USED POWER ORCHARD SPRAYer. Must be in good working order. Write CHARLES HOFFMAN, 704 North Church Street, Rockford, Illinois.

SAVE Money—Order at Low Cost Your Favorite Magazines

AMERICAN FRUIT GROWER for One (1) Year and Your Choice of Any Three of the Following Magazines for ONLY.....$1.00

Check Three

- ☐ American Poultry Journal.....1 yr.
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- ☐ Mother's Home Life.....1 yr.
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- ☐ National Sportsman.....1 yr.
- ☐ Pathfinder (wkly.).....6 mos.
- ☐ Poultry Tribune.....1 yr.
- ☐ Plymouth Rock Monthly.....1 yr.
- ☐ Rhode Island Red Journal.....1 yr.
- ☐ Successful Farming.....1 yr.

AMERICAN FRUIT GROWER, 1370 Ontario St., Cleveland, Ohio.

These offers are good only in U. S. A.

Enclosed find $..... for which please send me the magazines marked with an X.

Name.....

Postoffice.....

R. F. D..... State.....

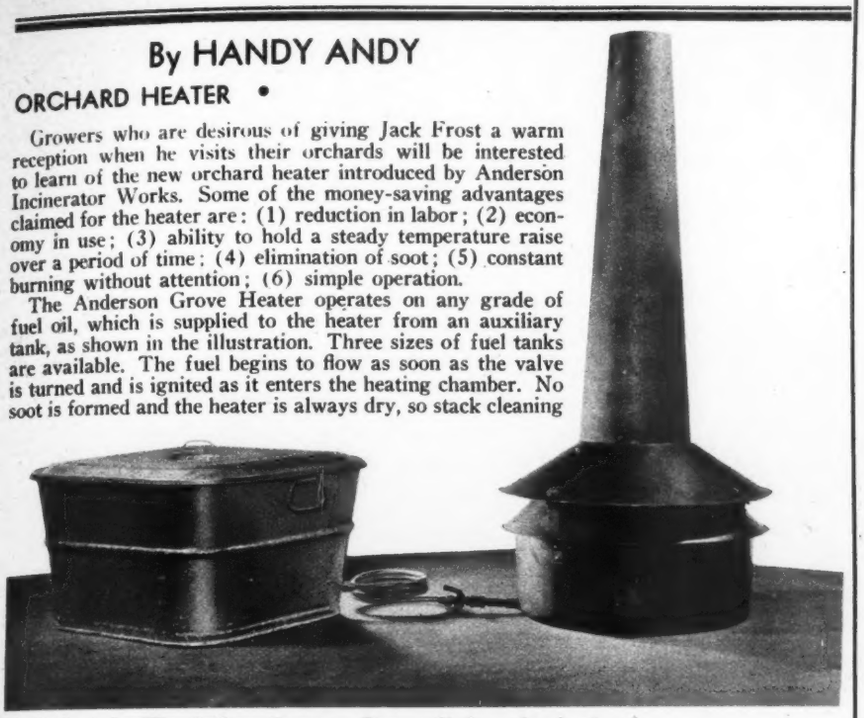
NEW • ORCHARD HEATER

By HANDY ANDY

ORCHARD HEATER •

Growers who are desirous of giving Jack Frost a warm reception when he visits their orchards will be interested to learn of the new orchard heater introduced by Anderson Incinerator Works. Some of the money-saving advantages claimed for the heater are: (1) reduction in labor; (2) economy in use; (3) ability to hold a steady temperature raise over a period of time: (4) elimination of soot; (5) constant burning without attention; (6) simple operation.

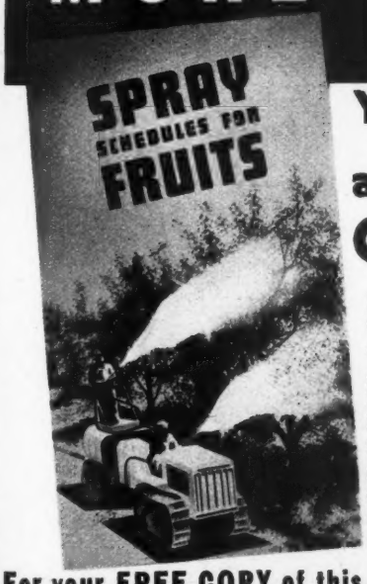
The Anderson Grove Heater operates on any grade of fuel oil, which is supplied to the heater from an auxiliary tank, as shown in the illustration. Three sizes of fuel tanks are available. The fuel begins to flow as soon as the valve is turned and is ignited as it enters the heating chamber. No soot is formed and the heater is always dry, so stack cleaning is eliminated. The fuel continues to flow until the valve is closed.



An intense and constant heat is made possible by drawing in cold air from the surrounding ground, heating it to a high temperature and radiating it to the fruit planting through the sides and top of the heater.

The heater is recommended for citrus fruits, pecan groves, cranberry bogs and strawberry plants and undoubtedly growers of other tree fruits and brambles would find it of value to obtain detailed information on the heater.

MORE FACTS



You ought to know about PEST CONTROL

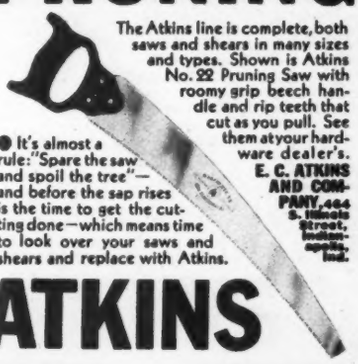
Just off the press! Authoritative information and spray schedules for effective control of Scale Insects, Red Mite, Apple Aphis and Red Bug.

Rid your orchards of these pests . . . and help protect your profits—with SUNOCO SPRAY, the safe, effective petroleum product successfully used by fruit growers for more than 17 years. Mixes readily with water—and stays mixed. *It's Non-Corrosive!*

For your FREE COPY of this new folder, write Dept. SS-26
SUN OIL COMPANY • Philadelphia, Pa.

SUNOCO
SELF EMULSIFYING SPRAY

NEXT SUMMER'S CROP BEGINS WITH *this Month's* PRUNING



The Atkins line is complete, both saws and shears in many sizes and types. Shown is Atkins No. 22 Pruning Saw with roomy grip beech handle and rip teeth that cut as you pull. See them at your hardware dealer's.

● It's almost a rule: "Spare the saw and spoil the tree"—and before the sap rises is the time to get the cutting done—which means time to look over your saws and shears and replace with Atkins.

E. C. ATKINS AND COMPANY, 444 S. Illinois Street, Indianapolis, Ind.

ATKINS SAWS and SHEARS

Atkins No. 100 Pruning Shear. Improved design prunes faster, easier, without strain. Tough alloy blade stays sharp.

BREADY Junior Tractor
CULTIVATOR and LAWNMOWER

This Sturdy Junior Model is ideal for the professional truck gardener, nurseryman, grower of small fruits or the suburbanite with a few acres of garden and lawn.

This tractor can be equipped with either six-shovel steel cultivator or a two gang disc consisting of three 12-inch and one 11-inch disc on each side. Both the cultivator and the discs are adjustable and reversible to suit your needs.

An important feature of this tractor is the lawnmower attachment. We can equip this tractor with either push or pull type lawnmower or a power driven lawnmower.

You will be surprised at the simplicity, ease of operation and low cost.

Write for descriptive literature on this handy tool.

BREADY TRACTOR AND IMPLEMENT CO.
201 Aurora Rd. Solon, Ohio

UNITED'S B. B. (BLOCK BAKED) CORKBOARD INSULATION
PATENTED

Assures maximum insulation efficiency at minimum cost. Moisture-resistant, compact, light weight, sanitary, structurally strong, flexible.

Write for particulars.

Literature on request

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GET OIL on CREDIT

SAVE MONEY—PAY LATER
WE SHIP ON TRIAL

We'll ship you 10 gallons or more of finest Auto, Truck or Tractor Oil on trial. Take as long as 5 months to pay. Order your season's requirements for LESS MONEY. Prices rising—act now for biggest savings.

SATISFACTION GUARANTEED OR NO PAY

Over 100,000 satisfied farm customers have found Valley Oils are best and cost less. If not satisfied, return at our expense. We stand freight and Federal Oil Tax. New steel containers and leak-proof faucets free. Write today. No obligation.

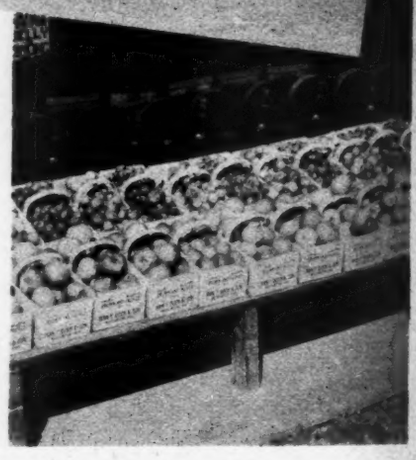
VALLEY OIL CO., Dept. 431, Cleveland, Ohio

ROADSIDE MARKETING

QUALITY AND PACK NOT PRICE MAKE THIS ROADSIDE MARKET A SUCCESS

By ROY JAMES

Customers have learned that the name Quick is synonymous with quality, and 90 per cent of them return again and again to patronize this simple yet attractive roadside market.



Quality fruit, cider and fruit butters are offered the motoring public at the Quick market in neatly arranged, readily seen and easily accessible displays. Price tags are omitted.

ON the four lane, flat and nearly straight brick road which accommodates the endless stream of traffic that flows between Cleveland and Akron, Ohio, an immaculately clean roadside market, bulging at different seasons of the year with apples, peaches, plums, pears, cherries, cider and apple butter, lies to the right of the southbound motorist about seven miles before the city limits of Akron.

"The customer remembers the quality long after he forgets the price," might well be the motto of this market, for it is the rule under which all sales are made. Ivan T. Quick, owner of the market, has been heard to declare very decidedly and more than once that he is not a price merchant. He continually warns his salesmen against quoting prices before the customers have seen the fruit, and no roadside signs except one advertise the price of the fruit.

Hearing Ivan Quick assert over and over again that all sales are made on quality and quality alone would lead one to believe that prices are at least moderately high. But a glance at the price list shows that they are well in line with prices at other roadside markets.

For instance, 2½-inch Delicious are sold for 35 cents a peck. Prices rise as apple sizes rise, for consumer-conscious Quick realizes that Mr. John Public will pick up a large apple before he will reach for a small apple and is willing to pay for the difference. Accordingly, the 2¾ Delicious sell for 45 cents a peck, and the 2¾ red strain go for 50 cents a peck. Quick's customers are willing to pay a premium for color as well as size.

Quick sells his fruit in corrugated paper peck and half-peck baskets with the name Ivan T. Quick & Son attractively printed on the side of the basket. He believes the way the fruit is displayed is important, which accounts for the good-looking arrangement of fruit within the store. Differing from other successful roadside market owners, Quick asserts that pack is important. He says he can vary the amount of sales by the type of package the fruit is sold in and the way the fruit is placed in the package. For instance, he says the consumer will nearly always buy a peck basket hand-packed before he will buy a basket jumble-packed even though there are a few more apples in the jumble-packed basket.

Quick isn't one to skimp on his advertising. He agrees wholeheartedly with the advertising executive who once said that trying to run a business without advertising is like winking at a girl in the dark. Besides spending $600 a year in newspapers and a smaller sum on direct mail advertising he maintains well-built and attractive signs at spots one mile and two miles from the market. As if that wasn't enough, he has erected two huge red apples on top of the store, with "Quick's" painted diagonally across the middle of the fruit which the motorist can't possibly avoid seeing.

The percentage of regular customers at the Quick market is growing every year due to the cumulative effect of the advertising Quick does in the local newspapers. He says he is building up the power of his advertising by never failing to advertise, just as he is building up his soil with cover crops and fertilizers. He cannot tell exactly how profitable his advertising is, but he knows that each ad is read by new persons every day and is serving to make his market more and more well-known.

In 1940, according to Quick, 90 per cent of the people who came to his market were regular customers and he believes a higher percentage will be steady customers in 1941. Of course, Sunday is a different proposition because more people drive into the country on this day and the percentage of regular customers is diminished, going as low as 70 per cent.

People buy at the Quick store not only for themselves but for friends in Akron and Cleveland. One girl customer said to Quick, "Really, Mr. Quick, you owe me a commission because I buy fruit from you for my friends in Cleveland as well as for myself."

Ninety per cent of the peaches, 50 per cent of the prunes, 50 per cent of the grapes, 100 per cent of the pears and 30 per cent of the apples are sold through the roadside market. Quick gets double the wholesale market prices on his Bartlett pears, selling them for $2.50 a bushel.

The store is open from eight in the morning until eight at night and from the opening of the sweet cherry season about July 1 to along about April 1 when the apple crop has been entirely sold. April 20 has been the latest closing date thus far.

Quick vigorously supports roadside markets for he believes them to be a reliable source of profit for the fruit grower harassed by low wholesale prices.

In '41... Facts... Features... Figures ...all tell you to BUY CHEVROLET!

"QUALITY QUIZ"	CHEVROLET	NO. 2 CAR	NO. 3 CAR
90-H.P. ENGINE	YES	NO	NO
CONCEALED SAFETY-STEPS	YES	NO	NO
VACUUM-POWER SHIFT AT NO EXTRA COST	YES	NO	NO
BODY BY FISHER WITH ONE-PIECE TOPDRAFT TOP	YES	NO	NO
UNITIZED KNEE-ACTION	YES	NO	NO
BOX-GIRDER FRAME	YES	NO	NO
ORIGINAL FISHER NO DRAFT VENTILATION	YES	NO	NO
TIPTOE-MATIC CLUTCH	YES	NO	NO

ONLY CHEVROLET HAS ALL THESE QUALITY FEATURES

YOU'LL SAY "FIRST BECAUSE IT'S FINEST!"

EYE IT--TRY IT--BUY IT!

1. It's the most powerful and most spirited of all the biggest-selling low-priced cars!

2. It's the only low-priced car with all the modern, up-to-date features listed here in Chevrolet's famous "QUALITY QUIZ"!

3. It's built to last—built to give you fine, dependable service over a long period of time—and to save you money every day on gas, oil and upkeep!

You'll be making the best possible buy, at low cost, when you buy your new Chevrolet for '41!

You'll get the most *modern* and most *beautiful* low-priced car, because only Chevrolet has a fine, luxurious Body by Fisher and Concealed Safety-Steps at each door, such as are featured on higher-priced cars.

And what's more, you'll get the *most power, fastest acceleration* and *most comfortable driving and riding system* to be found in any big seller in the low-price field, because Chevrolet is "tops" in these qualities as well as in all-round economy of operation and upkeep!

Choose Chevrolet for '41 . . . *newest edition of the car that has out-sold all others for 9 of the last 10 years* . . . and you'll get America's No. 1 car value!

CHEVROLET MOTOR DIVISION, *General Motors Sales Corporation*, DETROIT, MICH.

Again CHEVROLET'S the LEADER!

PROTECTION *that Pays*

According to successful orchardists, spraying with DOW'S *DN* DORMANT Sprays and "MIKE" Sulfur is protection that pays big dividends in more effective insect and fungus control.

The *DN* DORMANT Sprays are more effective and will protect the crop against a greater variety of insects than any other dormant spray. They are easy and economical to use and harmless to both workers and equipment.

"MIKE" Sulfur is non-caustic—more than 95% active sulfur and is 15 times finer than ordinary 325 mesh. "MIKE" Sulfur goes into water suspension almost immediately, stays free-flowing indefinitely and does not deteriorate with age.

Spraying with these two proven insecticides is your protection against crop infestation and consequent loss of income. Write for more complete information.

THE DOW CHEMICAL COMPANY
MIDLAND MICHIGAN

Branch Sales Offices: New York City, St. Louis, Chicago

DN DORMANT SPRAYS

"MIKE" SULFUR

DOW INSECTICIDE FOR EVERY PURPOSE